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1779



HISTORY

OF

INLAND

NAVI-

GATIONS

BRINDLEY

1779











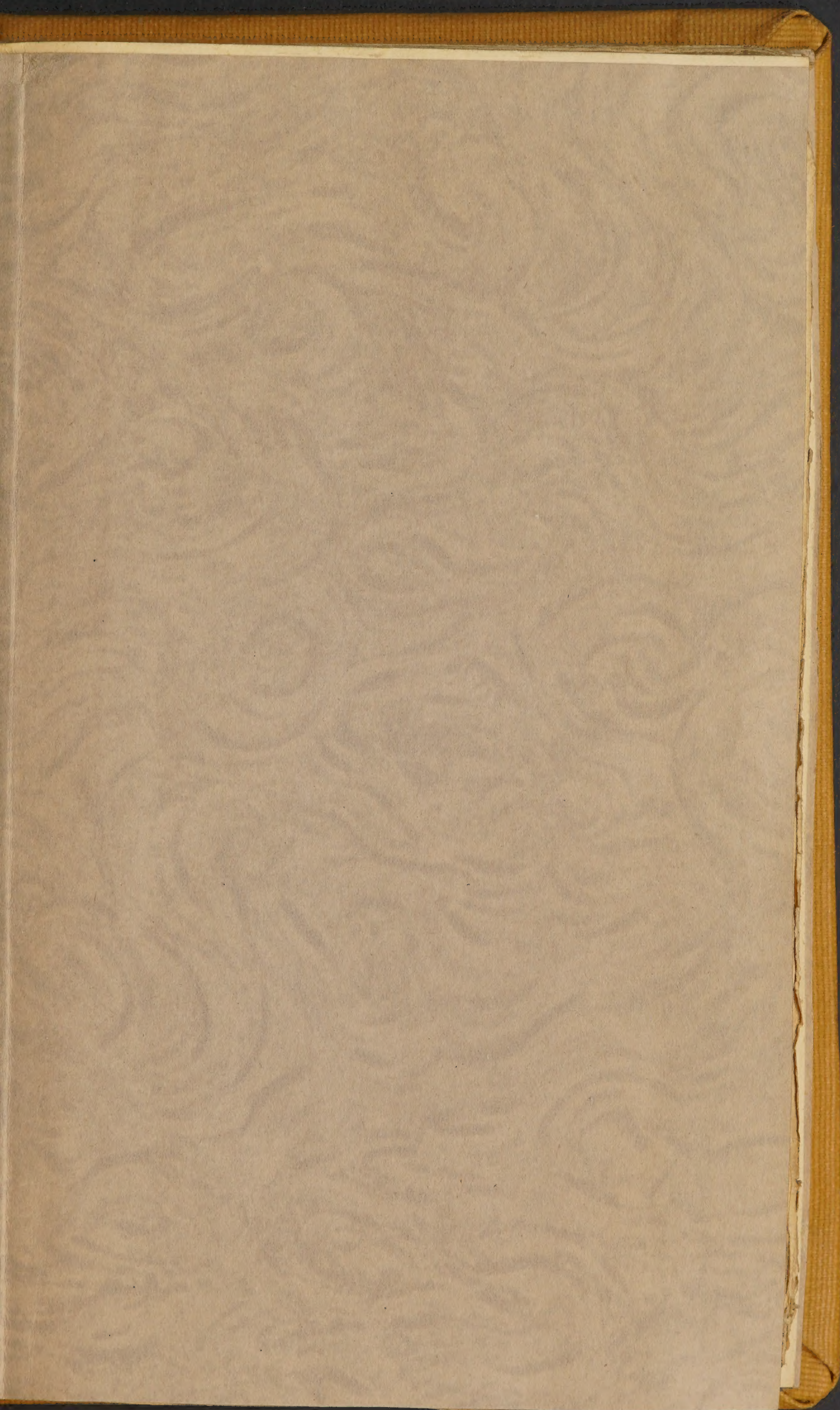
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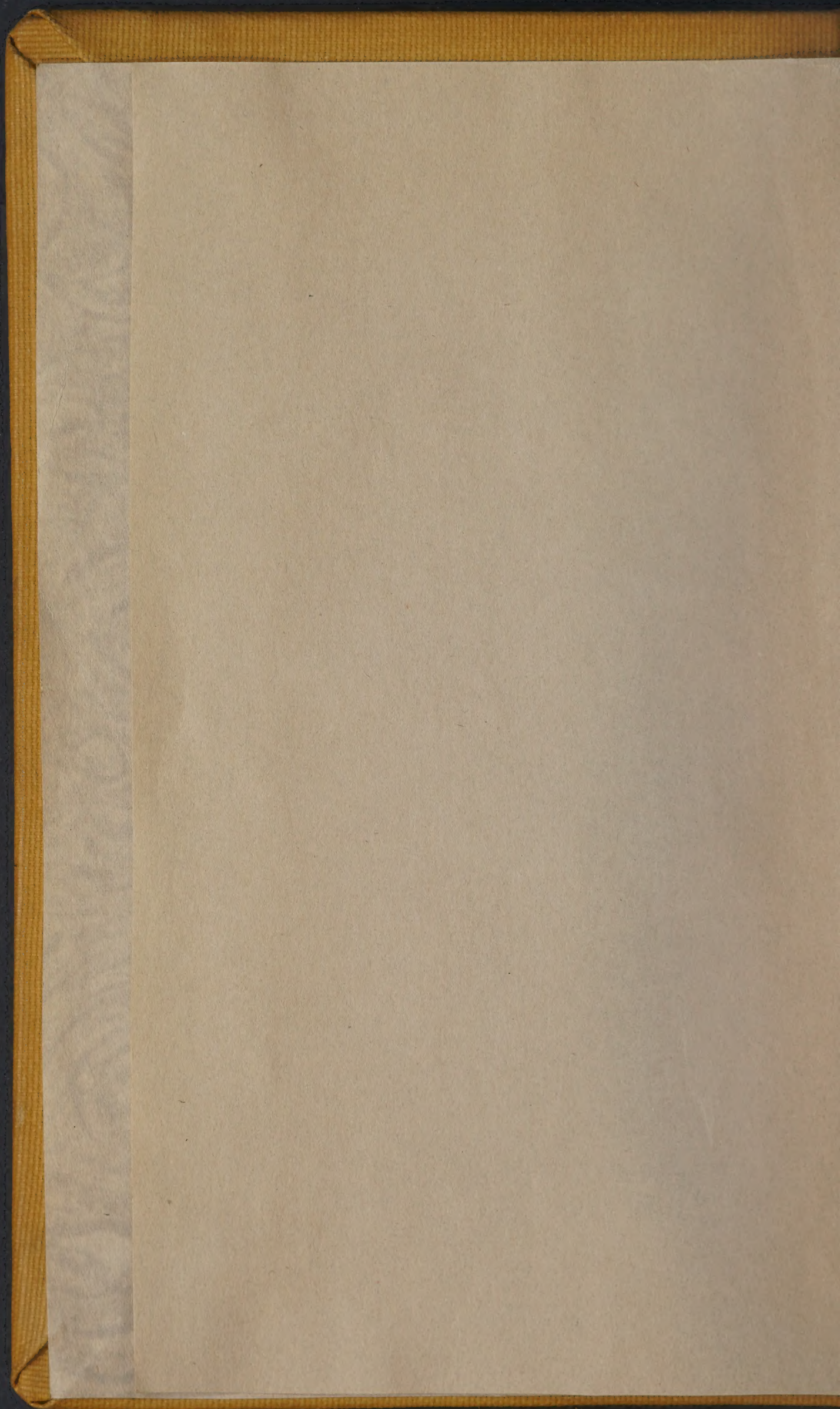


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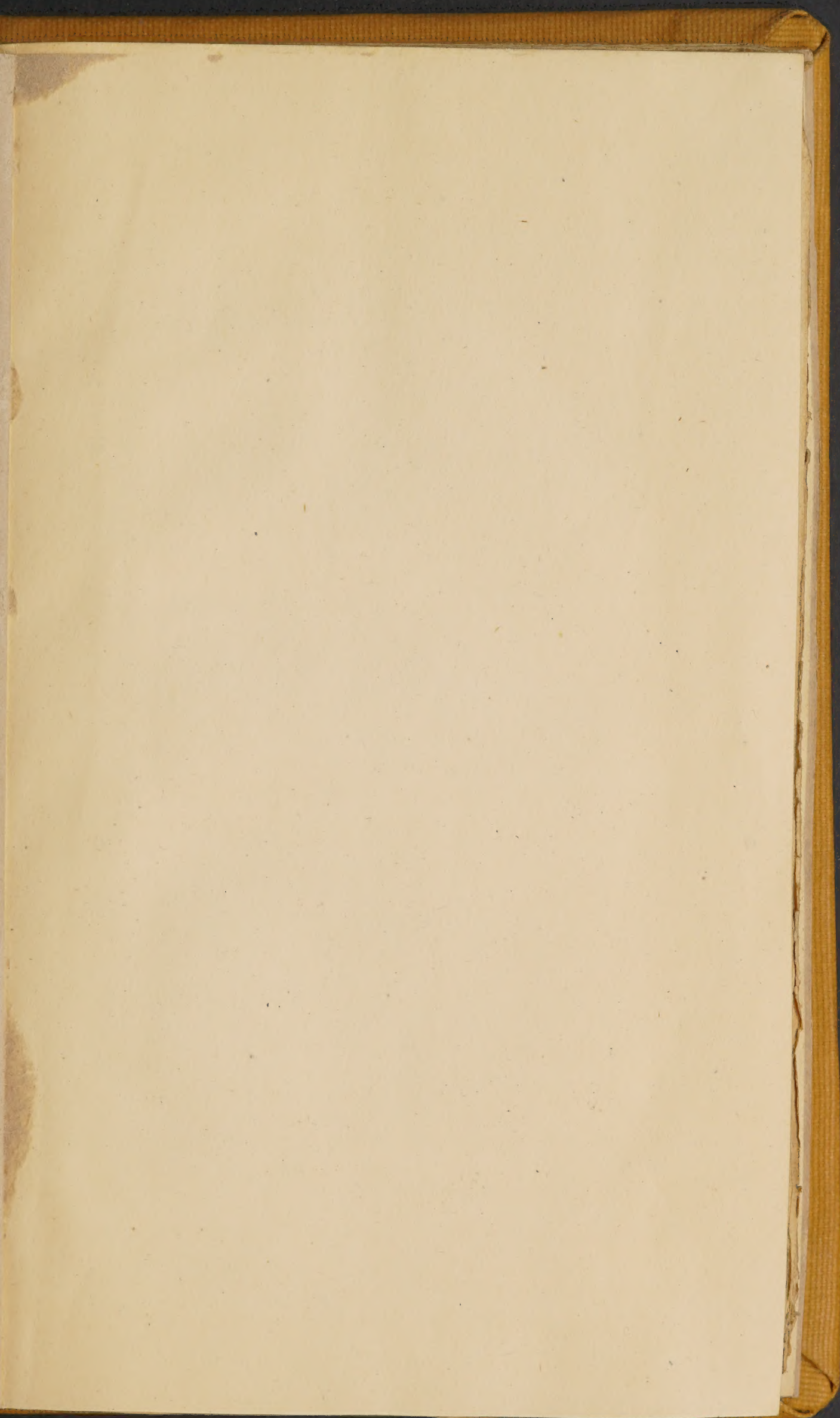




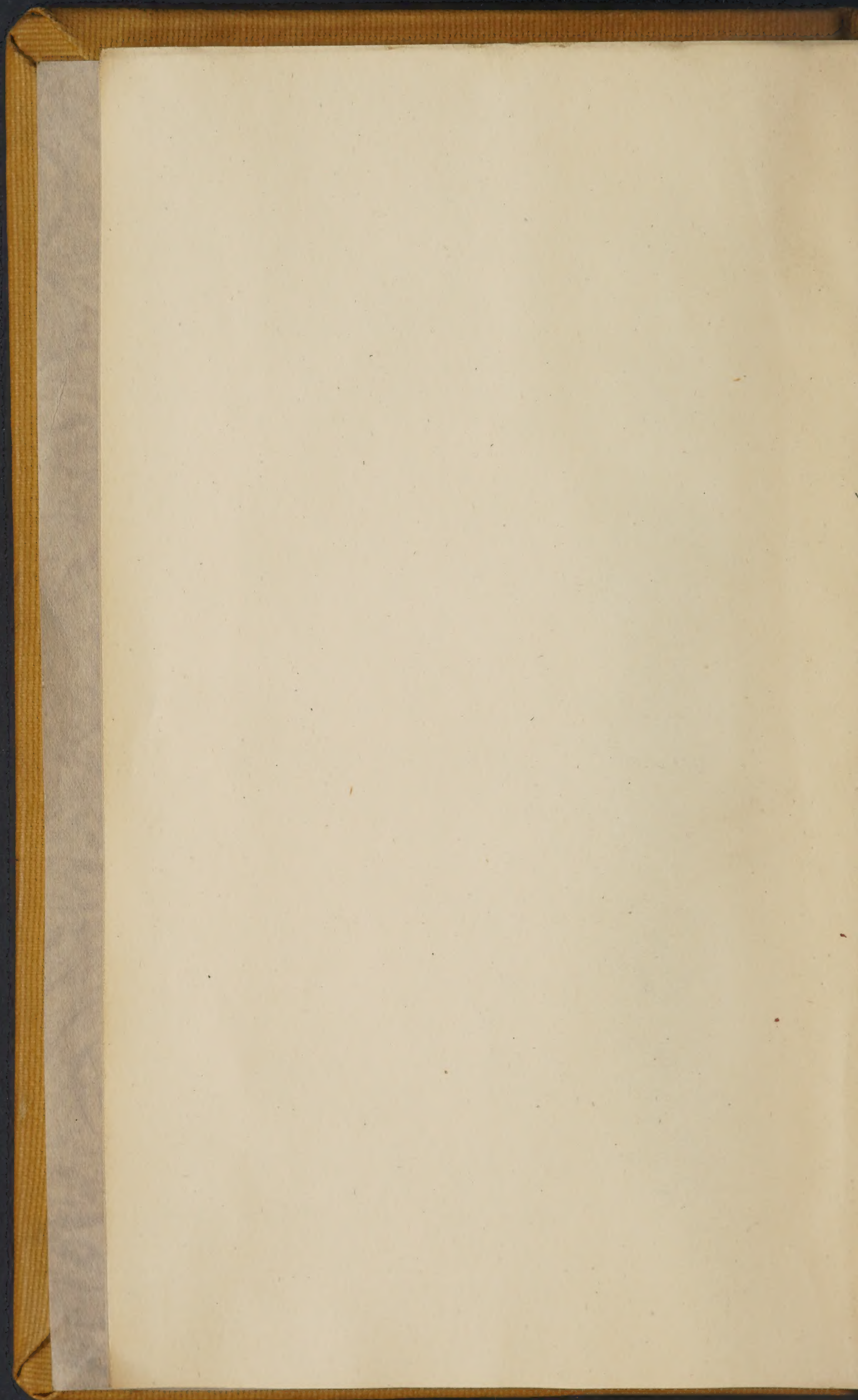




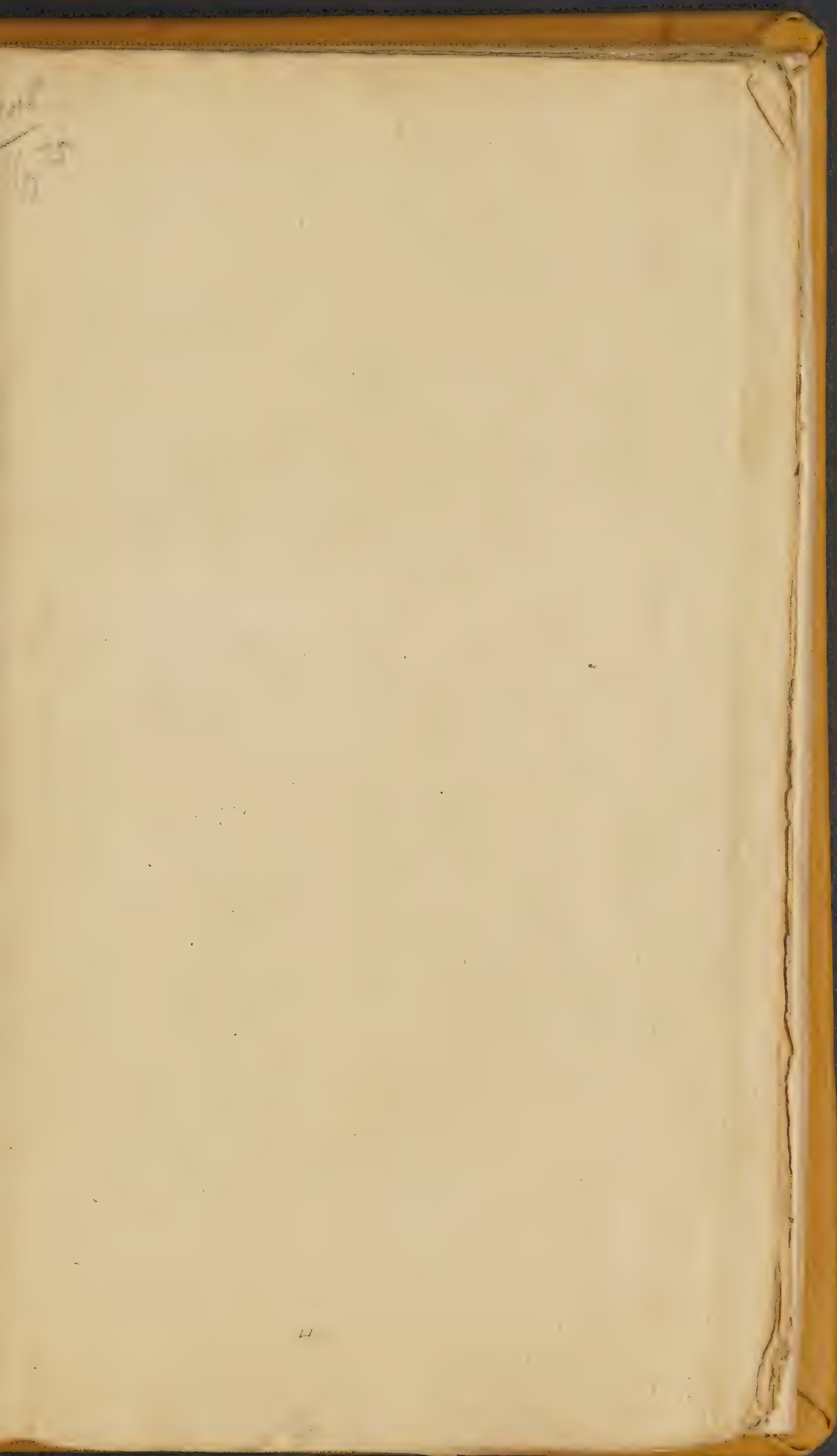










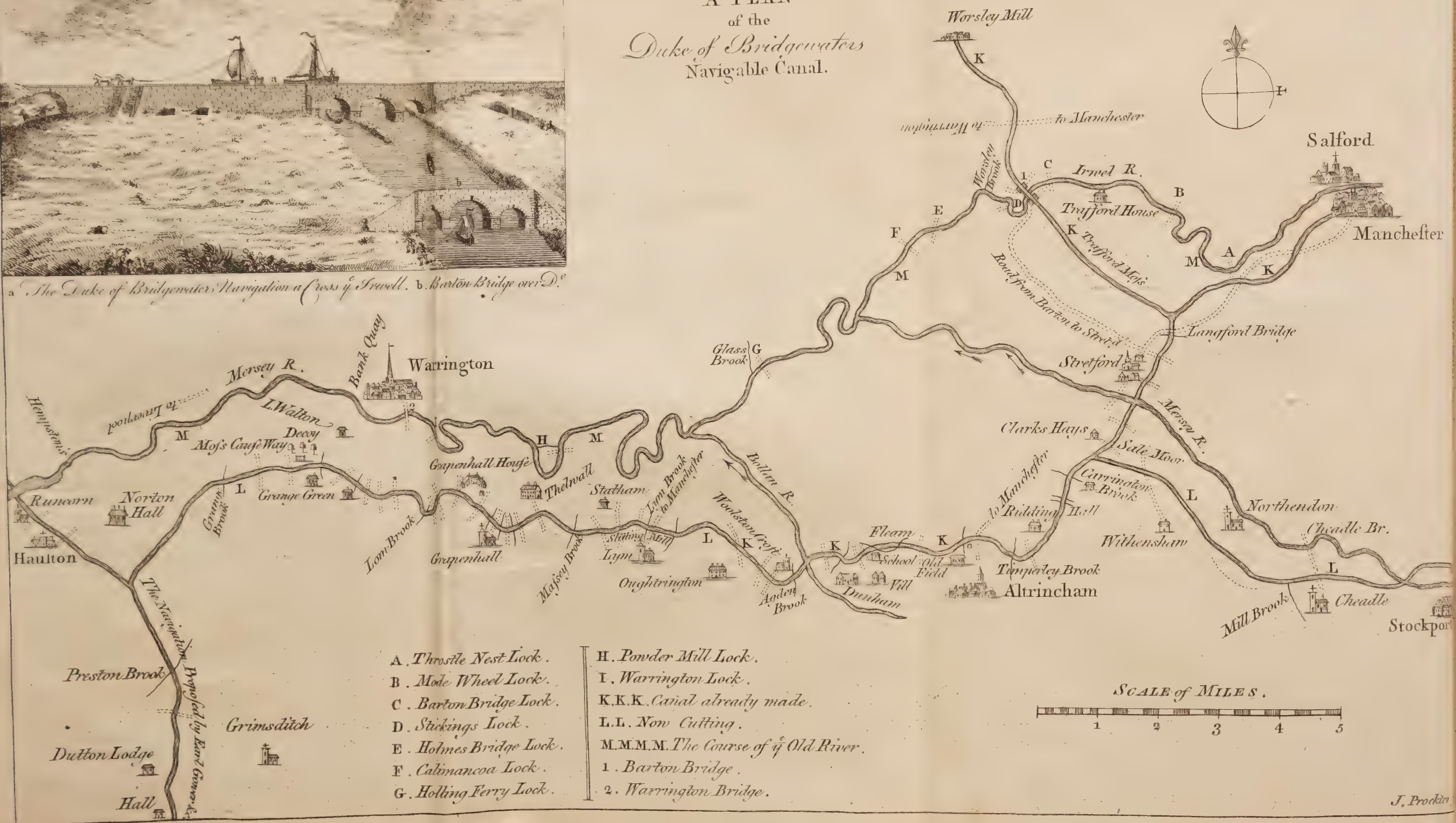






a. The Duke of Bridgewater's Navigation a cross of Irwell. b. Barton Bridge over D.

# A PLAN of the Duke of Bridgewater's Navigable Canal.





THE  
HISTORY  
OF  
INLAND NAVIGATIONS,  
Particularly that of the  
DUKE OF BRIDGWATER.

Illustrated with  
GEOGRAPHICAL PLANS,  
Shewing the  
Counties, Townships, and Villages through which these  
Navigations are carried, or intended to be.  
The Whole shewing the Utility and Importance of  
INLAND NAVIGATIONS.

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The THIRD EDITION, with ADDITIONS.

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LONDON,  
Printed for T. LOWNDES, in Fleet-street, 1779.

(Price 2s. 6d.)



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# REFERENCE to the PLAN of all the Inland Navigations compleated or now making in *England*;

Done from actual Surveys, made and drawn by Mr. *Hugh Henshall*, Engineer, and Successor to Mr. *Brindley*:

Worked from an Engraving, on a Sheet of Imperial Paper, and fold, Price 5s. by T. LOWNDES, in Fleet-street.

		Length.			Rise.		Fall.	
		M.	F.	C.	Feet.	In.	Feet.	In.
The Duke of Bridgewater's Canal, coloured <i>Green</i> .	Worsley to Manchester and Preston Brook,	29	2	0			Level.	
	Preston Brook to Low Water at Runcorn,	0	0	0	0	0	95	0
	Branch to Stockport,	7	4	0	60	0	0	0
Canal from the Trent to the Mersey, <i>Yellow</i> .	Preston Brook to Harecastle,	30	1	0	326	0	0	0
	Harecastle to the River Trent,	63	0	0	0	0	316	0
Wolverhampton Canal, <i>Green</i> .	Haywood to the Junction of the Birmingham Canal,	22	4	0	125	0	0	0
	Junction to the River Severn,	24	0	0	0	0	301	0
Birmingham Canal, <i>Yellow</i> .	Wolverhampton Canal to the Summit, near Smethwick,	16	7	0	150	8	0	0
	Summit to Birmingham,	5	6	0	0	0	36	0
	A Branch to Collieries,	4	1	0	0	0	18	0
	Another ditto,	0	6	5			Level.	
Coventry Canal, <i>Green</i> .	Staffordshire Canal to Atherstone,	21	0	0	95	0	0	0
	Atherstone to Coventry,	14	4	0			Level.	
	Branches to Coal Mines,	1	4	0			Level.	
Oxford Canal, <i>Red</i> .	Coventry Canal to Hill Morton,	20	1	0			Level.	
	Hill Morton to Top of Napton Field,	17	1	5	88	0	0	0
	Top of Napton Field to Claydon,	8	5	1	0	0	0	0
	Claydon to Oxford,	36	0	7	0	0	204	0
Droitwich Canal, <i>Red</i> .	Droitwich to the Severn,	5	5	0	0	0	56	6
Chesterfield Canal, <i>Green</i> .	Chesterfield to Norwood,	11	6	8	45	0	0	0
	Norwood to Workop,	8	1	5	0	0	85	0
	Workop to the River Trent at Stockwith,	21	6	5	0	0	250	0
Leeds Canal, <i>Green</i> .	Low Water at Liverpool to Fouridge,	66	0	0	525	0	0	0
	Fouridge to the River Air at Leeds,	42	0	0	0	0	446	0
Chester Canal, <i>Red</i> .	Chester to near Barbridge,	14	5	9	170	10	0	0
	Barbridge to Middlewich,	8	5	3	0	0	40	0
	Ditto to Nantwich,	3	3	0			Level.	
Caldon Canal, & Rail way to Limeworks, <i>Red</i> .	Trent and Mersey Canal to Stanley Mofs,	6	6	2	75	0	0	0
	Stanley Mofs to Froghall,	9	4	9	0	0	60	10
	Rail way from Froghall to Caldon Lime-works,	3	1	7			Level.	
Langley Bridge Canal, <i>Green</i> .	Langley Bridge to the River Trent,	11	2	0	0	0	108	8
Stroudwater Navigation, <i>Red</i> .	Stroud to the River Severn,	8	0	3	0	0	102	0
Sankey Canal, <i>Yellow</i> .	Low Water in the River Mersey to St. Helen's,	12	0	0	90	0	0	0



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TO HIS GRACE  
The DUKE of BRIDGWATER.

MY LORD DUKE,

AS you early in life begun, and now have almost finished, a work which few princes would have ventured to engage in; as an Englishman, you have my hearty thanks for the great good done the kingdom, and particularly to those parts of it, which from my infancy I have most esteemed. Distant counties already see the mercantile profits that will arise from your Navigation, and are striving who shall be the first to imitate your works, which by men of great understanding were deemed impracticable; and others well skilled in the mathematical sciences have much admired the execution of them. It has been customary to erect monuments in honour of men who had during their lives distinguished themselves by patriotic services; but I wish to see your Grace represented in the prime of life by an elegant statue, or a distinguished pillar, fixed in the center of St. Ann's Square. This I propose as one grateful record of your fame, which the history of these times will spread through Europe; and I hope, my Lord Duke, to see your Navigation finished, and to bring you annual Treasures, such as few Peers can boast of.

I am,

MY LORD DUKE,

Your Grace's

Most obedient Servant,

Manchester,  
Feb. 24, 1776.

The EDITOR.



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## INTRODUCTION.

**W**HEN we consider that the wants and necessities of mankind are principally supplied by trade and commerce, it will appear of the utmost importance to render their communication with each other, for those salutary purposes, as easy and as commodious as possible. Thus navigation joins, as it were, the whole world in a social intercourse of benefits; it conveys the superabundance of the productions of one country or climate to another, destitute of those productions or manufactures, and returns to the other the natural or artificial commodities of that country; and every pen has celebrated those great and adventurous men, who, by their discoveries in this art, have spread knowledge, humanity, and improvement over every part of the globe. Thence have flowed into Europe a full tide of wealth and opulence; and the importance or weight of every nation in this happy quarter of the world, may be deduced from the encouragement they have given to trade, commerce, and manufactures, the few restraints they have laid upon these transactions, so necessary to the well-being of states and individuals; which make such an essential difference between the maritime and the military governments, as I venture to stile them, as every one must contemplate with delight and satisfaction.

Subordinate only to navigation upon the ocean,  
every attempt to facilitate an intercourse between



one district and another, in any particular country, to render the carriage of the natural or artificial products of the several provinces of a kingdom, ready and cheap, certainly merits the public attention and applause. Without the means usually employed for this purpose, the inhabitants of the northern and southern, or eastern and western parts of England, would be little acquainted with each other, or those of the midland parts, and the commodities they peculiarly grow or make, would be almost confined to their own consumption: but the planning, laying out, or improving roads for land communication and carriage, the rendering rivers, where nature has not done it, navigable for vessels of burthen, has admirably answered these ends in many respects: still there were inland districts remaining, which had no opportunity naturally of a water communication, and many still, whose inhabitants have never thought of any such conveyance; by which large tracts of country are locked up in almost impenetrable gloom, no verdure cheers the eye, and the industrious peasant beholds the fruits of his daily toil confined to his own, or sent to a distant market, with such a load for carriage as eats up his little gains, and cramps him in obtaining the necessary articles of subsistence.

The present age, however, will shine with distinguished lustre in the annals of our country: We have rendered ourselves renowned by our warlike achievements, and, though late, we have begun to improve our country, (during the days of peace) by many praise-worthy and salutary undertakings, of which none redounds so much to the public benefit as *inland navigations*, which, as will appear in the sequel, have been (where already undertaken) executed with spirit, and where only planned,



ned, proposed with judgment, and enforced by the most solid and convictive arguments; which selfish interest, obstinacy, and ignorance, have, in vain, endeavoured to refute.

I have said, it was late before this country found out the benefits of inland navigation, which its situation as an island, and its many fine navigable rivers, might conduce to retard us from the thoughts of, though our neighbours and natural allies, in Holland, out of a small tract of marsh-land, by this means, particularly, have raised a populous and powerful state, revered and courted by all the world. They have intersected their country with artificial canals, the support and repair of which they attend to with the utmost precaution and diligence; these canals convey away, or receive those waters which otherwise would drown their country. They are the conveyance of travellers and passengers from place to place, as well as of goods of every kind. They turn mills, weave tape, split iron, and perform abundance of other profitable labour. An inhabitant of Rotterdam may hereby breakfast at Delft or the Hague, and dine at Leyden; he may sup at Amsterdam, or return home again before night. In frosty weather, travelling on these canals, on skaits, is still more expeditious, and carts and sledges are substituted, for heavy burdens, in the room of boats and barges, which are as much employed on their canals as in their streets. By means of their canals and navigable rivers, they carry on that immense inland trade to all parts of France, Flanders, and Germany, which has never been exceeded by any other people. France exhibits also instances of industry and contrivance in canals for inland navigation. The canals of Briere and Orleans supply



Paris with the productions of divers provinces, and the south of France with the cloths, stuffs, and camblets of Abbeville, Amiens, Rheims, Sedan, and Lisle; from whence, by the same conveyance, they furnish the north of France with Provence oils, Muscadel wines, dried fruits, hard ware, paper, and other merchandizes of the south. The junction of the Somme with the Oyse, opens to Paris a ready conveyance for the grain of Picardy, and the sea-coal, wood, butter, copper, and spices of the northern provinces of the kingdom. The junction of the Ocean with the Mediterranean, the works for which commenced in 1666, were resumed in 1667, and have answered the great ends proposed ever since 1682, will ever do honour to the memory of Lewis XIV, his able minister Colbert, and to Riquet the engineer, who conducted this amazing work. As this work is not much known here, I shall digress into a short account thereof, from a celebrated performance \*, from which, all the difficulties considered, our present undertakers of inland navigations may reap spirit and fortitude, to stem all the difficulties that may occur in their patriotic labours, when they survey what unabated industry and ever availing perseverance have produced in a neighbouring kingdom.

“ The hill of Naurouse, which is considerably nearer to Thoulouse than to Narbonne, was pitched upon as the most proper place from whence to draw two canals; one whereof was to fall into the Garonne, and the other into the Mediterranean. M. Riquet made choice of a place upon this hill, that was raised 600 feet above the level of those two waters, from whence he observed that the ground

\* Nature Displayed.



lay flanting down, almoſt in one continued deſcent to them on each ſide. Upon this ſpot he endeavoured to make a large collection of waters, in order to diſtribute them into the two canals; one whereof was to deſcend to Thoulouſe, and the other to fall into the Mediterranean. Though there was but one ſpring at Naurouſe, and that inſufficient to answer the end propoſed, yet he brought thither, from the adjacent mountains \*, by virtue of an aqueduct, or conduit, of about five leagues in length, a current of water between five and fix thouſand inches both in breadth and depth; which ſtream being diſtributed in the two canals laſt mentioned, forms in every part a body of water of above a million of cubic toiſes †. In order to be guarded againſt any accidental drought, he cauſed a long reſervoir to be dug near Naurouſe, which contained above 600,000 cubic toiſes of water, and was reſerved to ſupply the ſource of diſtribution in caſe of a dry ſeaſon. In ſuch places where the land lies upon a deſcent, the water is pent up in large fluices, between 20 and 30 feet in breadth, incloſed on each ſide by two high walls, that run parallel one to the other, and by a pair of ſubſtantial gates. As the water falls down from the upper fluices into the lower, it forms a grand caſcade, and ſtrikes the eye of the ſpectator with wonder and delight. We will ſuppoſe a veſſel in its paſſage from Narbonne, after it has failed through the canal that runs along the plain, arrived at the foot of one of theſe fluices: the gates are inſtantly flung open; the water ſo hemmed in as aforeſaid, ruſhes forth with an impetuous force; and blending with that in the canal, forms one

\* The Robine, or channel, that conducts the waters from the back mountains to the ſource of diſtribution.

† A meaſure conſiſting of fix feet, or a fathom.



common level. Upon this, the bark sails into the sluice, and the gates are shut up again. The water which descends from the upper sluice, rises, by slow degrees, several toises; the vessel accordingly rises with it, till it comes to a level with the water contained in the second sluice, by means whereof a bark that is coming from Narbonne may pass, without any obstruction, out of the first sluice into the second; or, one coming from Thoulouse, may be introduced out of the second into the first. The gates of the second sluice being shut, the vessel in the same manner mounts into the third: and thus it ascends from sluice to sluice, till it comes to the source of distribution, and then, by the same sort of conveyance, falls down to Thoulouse. The channel, from the place where it empties itself into the port of Cette to Thoulouse, is at least 70 leagues long. They were frequently reduced to the necessity of turning and winding it to preserve the level, to fortify it with piles in those places where the earth gave way, to convey it over bridges and stone arches, in the valleys; to lay some mountains level with the ground, and cut a passage through others, and arch them over, for the reception of its waters. Above 2,000,000 of cubic toises of earth, and more than 5000 of solid rocks, have been hollowed for the preparation of its bed: one hundred and fourteen sluices have been erected for the ascent and descent of vessels; sixteen prodigious mounds have been raised to divert such waters as might any ways obstruct their passage, and twenty-four spacious drains to empty the canal, upon any apprehensions of its being too much embarrassed or overcharged with mire and sands. Upon a moderate computation, we are informed that there are above 40,000 cubic toises of stone-work in these erections, together with a projection into the sea of 200 toises, and



and a pier of 500, which at present secures the port of Cette, and renders it a very safe and commodious harbour: which, as the coast of Languedoc has no havens at all, and is very dangerous, is so much the more advantageous. The expence of this stupendous work was nothing, compared to the advantages reaped therefrom."

Peter the Great, Czar of Muscovy, amongst his other grand designs, had planned a navigation for conveying all the rich goods of Persia to his new city of Peterburgh. They were to be first transported to Astracan, through the mouth of the Volga; from thence, by a conjunction of canals, into the river Don; by another conduit into the Occa, and from thence to Moscow, by the river Mosca: afterwards, by several other channels of communication, through the Dwina to Archangel, on the White Sea; and lastly, through the lake Ladoga, which lies at the foot of the gulph of Finland, to Peterburgh. But alas! the death of this great man prevented the perfect accomplishment of this noble undertaking, which would have made Peterburgh, perhaps, the most populous and best place of traffic in the world.

But not to confine myself to Europe, let it be remembered, that the extensive empire of China, whose policy in many particulars is well worth attending to, owes the greater part of its riches and fertility to those numerous canals, so useful for the transportation of the produce and merchandize of one province into another. They are bordered with keys of free stone, and in low, marshy places, they have raised very long causeways for the conveniency of travellers. Innumerable canals are also cut through all their lands, from the many rivers, lakes,



rivulets, and torrents with which that country happily abounds. These canals have bridges over them, of three, five, or seven arches, to open a free communication with the country: the middle arch is generally very high, that barks may pass under it with their masts standing. The principal canals discharge themselves on the right and left into divers other small canals, which are divided again into a great many rivulets, which are conducted to different large towns, and very considerable cities. But the great canal, called the Royal Canal, which is three hundred leagues in length, is without comparison; which, at infinite expence, and with amazing industry, is carried on through many provinces, upon which all the riches of the south and north are conveyed, and by its communication with other canals and rivers, the Chinese can travel or convey goods, very commodiously, from Peking, the capital, to the farthest part of the empire, being about 600 leagues, by water: they commonly have a fathom and an half of water in this canal, to facilitate their navigation: when the water is high, and like to overflow the neighbouring fields, they take care to open the sluices to convey it away, and to keep it at a certain height in the channel: there are inspectors appointed to visit the canal continually, and workmen to repair the damaged places.

But to return from this long, though not unnecessary digression: By inland navigation the greatest benefits arise to trade and commerce; as it much lessens the price of carriage, opens a ready communication from one part of the kingdom to another, as has before been observed, and from every one of those parts to the sea; by which the products and manufactures of the kingdom in general will be afforded at a moderate price; as every manufacturer,  
who



who can lay in his raw materials, will have, thereby, food and fuel cheap, and carry their manufactured goods to a proper market at a smaller expence, whereby they may sell them at a moderate rate, and ever have the preference there, where undue influence, or imposts do not hinder them. These inland navigations highly benefit the manufactures where they are established; occasion the establishment of many new ones; in situations where the land, before, could be of little value and bare of inhabitants, clearing and enlivening every district where they have been established, and adding riches and fertility in every part through which they are extended. I say fertility, because it is well known that every meadow or pasture in the neighbourhood of refreshing streams, displays a verdure which is not to be discovered in those dry, withered, and adust spots which do not lie near the banks of a river or running waters. The cattle and horses in the pastures on the banks, are fatter, more delicious in taste, afford, in greater quantities, and of a better quality, that salubrious tribute which forms the delicious productions of the dairy; and the horses are fitter for labour, or to contribute to the sport or pleasure of their possessors. Sheep, indeed, are excepted, who thrive best in a dry soil. Inland canals, for the purposes of navigation, in great measure supply the deficiency of rivers or streams which nature has denied to a country, and in a remarkable degree serve for a secondary, though very important purpose: trees and plants receive their nutriment, as is incontestable, from their leaves as well as their roots; and the dew of the night diffuses on the leaves an humidity, which they imbibe and distribute through the whole plant, the weight whereof, at such times, as Dr. Hale has observed, is considerably increased: This necessary humidity is principally



cipally produced by the rivers or canals in the vicinity ; which exhaling from them in mists, is transported by the winds to descend in refreshing dews, not only on such places as are adjacent, but on such likewise as are at some miles distance ; so that hereby arises one great benefit from inland navigations, that perhaps has not been enlarged upon before.

It is not to be disputed, that these inland navigations greatly benefit also the merchants who reside at the ports where they terminate ; for they are thereby enabled to export greater quantities of goods from those parts which lie at a distance from the sea, and to supply a larger tract of country with their exports from abroad.

The navigations of the Aire and Calder, in Yorkshire, will elucidate the great utility of inland navigations, in the increase of established manufactures, and in the setting up of new ones. And it is well known, that the navigations to Manchester and the salt works in Cheshire, have contributed to the present flourishing state of the port of Liverpool. That inland navigations benefit greatly the landed gentlemen cannot be denied, as in many instances their lands have been improved to tenfold value. Without this artificial communication, corn, timber, iron, coals, stone, &c. would be of little use to the landowner, which the cheapness of carriage, now, will enable him to transport to a profitable market. They occasion the discovery of mines and minerals, which would be else useless to the owners ; they aid the cultivation of poor, barren, and waste lands ; they contribute to the stability and permanency of the public roads ; as the navigable canals prevent the burdening them with vast quantities of heavy goods, which



which do them most injury ; so that, from this relief, they may become the finest roads in Europe.

The construction and working upon these inland navigations, must of course be the cause of employing vast numbers of our poor ; besides that, when they pass through corn countries, near collieries, &c. the poor labourers are more readily furnished with food, and fuel is provided for their solace, and to carry on the manufactures that stand in need thereof ; and surely when we consider the various distresses our poor, consequent to their situation, labour under, too much praise cannot be bestowed upon those benevolent beings, who, by means of these inland navigations, render their lives more comfortable and happy.

I remember but one objection to inland navigations, that is not answered in the succeeding pages, viz. that they waste or take up too great a portion of land, in the countries through which they pass : But it will be a full and cogent answer to this objection just to observe, that *one mile* of the duke of Bridgwater's navigation takes up only *an acre and half* of ground. To conclude, it would be happy for this country, if private interest, prejudice, ignorance, or obstinacy, were not employed to discredit such patriotic undertakings, as must redound so greatly to the honour and welfare of the kingdom : But such is the tax ever laid upon attempts for the public emolument ; let them be proved ever so salutary, by the most convictive and forcible reasons, some opposition will be made, if it only flow from the natural vanity or malevolence of mankind. But it is time, in the present critical circumstances of the nation, when rivals in trade and manufactures are taking every advantage over us, when enormous taxes,  
and



and the advanced prices of the necessaries of life oppress our manufacturers and our poor; that we unite as one man in promoting those designs, which will contribute to raise our drooping commerce, to find employment for our labourers, and enable us to bear the burden of our numerous taxes with some degree of chearfulness and patience: by which we may once more raise up our heads, and recover what we have lost. Let us say, at least, in the language of the poet,

*'Tis not in mortals to command success;  
But we'll do more, (my brethren,) we'll deserve it!*

ACCOUNT



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ACCOUNT OF THE  
DUKE OF BRIDGWATER'S  
NAVIGABLE CANAL, etc.

**I**N the session of parliament, in the years 1758 and 1759, his grace the duke of Bridgwater obtained an Act, for enabling him to cut a navigable canal, from Worsley to Salford, near Manchester, and to carry the same to or near Hollin Ferry, in the county of Lancaster.

Soon after the passing this Act, his grace begun his works, and made a navigable canal from Worsley Mill, to the public highway leading from Manchester to Warrington; but it being then discovered, that the navigation would be more beneficial, both to his grace and the public, if carried over the river Irwell, near Barton bridge, to Manchester; his grace applied again to parliament, to vary the course of his canal accordingly, and to extend a side-branch to Longford bridge, in Stretford, and obtained an Act for that purpose.

The making a navigable canal over the river Irwell, and filling up the hollow or low ground on the north side of this river, were esteemed to be a very arduous undertaking, and, by most persons who viewed the chasm, thought to be impracticable; but his grace being well supplied with materials from his own estate, hath already compleated this, which

was



was looked upon as the most difficult part of his undertaking, and hath now carried it into execution.

By the first Act, a rate or duty, not exceeding 2s. 6d. *per* ton, was granted to the duke as a recompence for the charges of making and compleating his navigation; and the second Act varies the course of the canal, and extends it, but makes no alteration with respect to the tonnage.

The duke, upon a further survey and taking levels, found it practicable to extend his canal from Longfordbridge, by Dunham, to fall into the river Mersey, at or near a place called the Hemp-Stones, below Bank-Quay, and so as to bring vessels into his canal at the lowest nepe tides; and having obtained a third Act for that purpose, undertakes this at his own expence, without any addition or increase to the tonnage.

[If navigations are advantageous to a country, that advantage must increase in proportion to their extent, and the intercourse and connections with the parts with which they communicate; and, allowing this to be a fact, there certainly cannot be a more interesting consideration, than the facilitating the conveyance of goods and merchandize, between the great trading towns of Manchester and Liverpool.]

It may not be improper here, to give a clear abstract of the acts of parliament above mentioned.

Act 1. Recites, in the preamble, that the persons named in Act 10 Geo. II. *for making navigable the river or brook called Worsley Brook, from Worsley Mill, in the township of Worsley, in the county palatine of Lancaster, to the river Irwell, in the said county,* have hitherto neglected to carry the said Act into execution, &c. And that a cut, or canal, may be made from a certain place in the township of Salford, &c. near Manchester, in the said county of Lancaster, to or near Worsley Mill, aforesaid, and

Middle



Middlewood, in the manor of Worsley, and to or near Hollin Ferry, in the same county; and supplied with water from the said Worsley Brook, and other brooks and places near, &c. &c. sufficient for floating or carrying of boats, and other vessels of considerable burthen, by which the conveyance of coals, timber, stone, manure, goods, wares and merchandizes to and from Manchester and Salford, &c. &c. will be greatly facilitated, &c.—The Act impowers his grace the duke of Bridgwater, his heirs, &c. to make and maintain the said cut or canal at his or their own proper costs and charges; to enter lands, dig and remove obstructions, and then to make towing-paths on the side of his canal, gutters and water-courses, locks, sluices, &c. &c. weighing-beams, bridges, arches, &c. for setting up posts, rails, &c. first making satisfaction to the owners of, or persons interested in, such lands or grounds, &c. &c. No water to be taken out of the river Irwell into his cut or canal: power is given to survey and set out lands, and all persons impowered to convey such lands to the duke. But the lands so to be set out, shall not exceed sixteen yards in breadth, except, &c.—No wharfs to be made between Salford and Barton Bridge, without the consent of the owners of the lands. Commissioners are named to determine differences, &c. between the duke and the proprietors of lands, &c. &c. to settle recompences: if parties will not submit to their determination, (i. e. of any seven of them) refuse to accept the purchase monies, &c. or to treat, or shall not agree, juries may be impanelled to assess the purchase monies, &c. Penalties are 20*l.* for the Sheriff or Coroner; 5*l.* for every Juryman, and person summoned who shall make default, to be levied by distress and sale of goods.—The commissioners may settle the proportions of the monies to  
be



be paid to the several persons interested, with an exception——Determinations, verdicts, and judgments to be kept by the clerk of the peace; and if the sum given by the jury be greater than that settled by the commissioners, then the duke to pay the expences of such jury.——Upon the payment of the sums assessed, the lands, &c. to vest in the duke;—and in default of payment, the sums assessed to be recovered, with full costs of suit, by action of debt, against the said duke, his heirs, assigns, &c. wherein no effoign, protection, privilege, wager of law, or more than one imparlance shall be allowed. If costs and damages are not paid in three months, to be levied upon the duke's coals or boats.——The works done in pursuance of this Act not to be subject to the sewer laws. The coals from the duke's mines, not to be sold for more than 4*d.* per hundred, at Manchester or Salford. Qualification for a commissioner or juryman, 50*l.* per ann. freehold, or 1000*l.* personal estate, after payment of all his just debts. The duke to fence the towing paths, from the adjoining lands, erect bridges, &c. or on neglect, the commissioners to do it, and levy the charges. Houses not to be taken down, or timber cut, &c. except such as are ascertained for the purposes of the Act.—The next clauses relate to the election of commissioners in the room of such as die or refuse to act, and regulates their meetings. Purchase monies for lands, &c. in strict settlement, to be placed out in government funds, &c. &c. Felony for any person to destroy or damage the works. The writings in pursuance of this Act to be exempted from the stamp duties, and no proceeding taken in pursuance thereof to be quashed for want of form. The navigation to be free, upon payment of the tolls. The duke, &c. impowered to fix the tonnage rates, which



which are not to exceed 2*s.* 6*d.* per ton, and rates neglected to be paid may be sued for or levied, and a farther allowance is to be made for goods remaining on the wharfs above 24 hours. The owners of lands, &c. to have free liberty to carry dung by the canal to their lands. Rights of lords of manors saved, and owners of vessels to be responsible for their servants. Vessels lying so as to obstruct the navigation, to be removed, and sunk vessels to be weighed up. The next clauses direct the manner of collecting and ascertaining the tonnage rates, the management upon differences, &c. Any person throwing ballast into the canal to forfeit 20*s.* Persons giving false evidence in the premises, to be prosecuted and punished as persons guilty of wilful and corrupt perjury. The proceedings of the commissioners to be registered, and a clerk appointed. The next clause directs the recovery and application of penalties: persons aggrieved may appeal to the quarter sessions for the county of Lancaster. The commissioners may act as justices. The former Act mentioned in the preamble is repealed; actions brought on this Act must be commenced within six calendar months after the offence, the party convicted is to pay treble costs, and the Act is to be deemed a public Act.

Act 2. Enables his grace, at his own expence, to make a navigable cut or canal from or near Worsley Mill, over the river Irwell, to the town of Manchester, and to, or near Longford Bridge, in the township of Stretford, in Lancashire. The powers of the former Act are extended to this, but the breadth of the canal and towing paths not to be limited. Power is given to make arches over the river Irwell, at Barton Bridge; but the navigation of the said river is not to be obstructed, provided the proprietors of the navigation of the said river do not open locks for longer time than necessary. The

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canal, arches, &c. to be the property of the duke. The duke's works not to be carried nearer the buildings of Mr. Lloyd, of Hulme, near Manchester, than 30 yards, &c. Nor is he to erect wharfs, &c. in Quay-street, Manchester, or upon Mr. Byrom's lands, except as excepted. Tolls to be paid on Crossford Bridge road, so as the same does not extend to a double charge; and coals which have been navigated on the canal, shall pay at the turnpikes only one moiety of their tolls or duties, granted by the Act 24 Geo. II. at such turnpikes as are erected in virtue of that Act. The trustees of that road may compound with the Duke for the carriage of coals thereon. The duke to maintain the bridges over the canal, where it crosses the turnpike road. The lords of manors rights are reserved, and the Act declared a public Act.

Act 3. Enables the Duke to make a navigable cut or canal from Longford Bridge, in the township of Stretford, in Lancashire, to the river Mersey, at a place called the Hempstones, in the township of Halton, in the county of Chester. The two former Acts are recited; and as the canal is capable of being extended, &c. (as above) power is granted to the duke to extend it at his own proper cost and charges, to remove obstructions, and to make arches and other works on the Mersey, and other works, bridges, roads, &c. Commissioners are named, their power settled (as in Act 1.) and their meetings. Flour, &c. which had paid toll before grinding, not to pay it again. Persons evading the payment of the toll forfeit 40 s. for every offence, to be recovered as in the first Act. No corn-mill to be erected on the canal or towing paths. The duke not to divert certain water-courses or streams of water therein mentioned; and a recompence to be made for using antient streams, which communicated with the rivers Mersey and Irwell. The next clauses di-



rect the application of forfeitures, and give the same power to the justices of Cheshire, as were, by the first Act, given to those of Lancashire. The tonnage duty to be taken, not to exceed 2*s.* 6*d.* per ton, and the same may be paid for, &c. and no higher duty to be taken upon the navigation than is authorized by the former Acts. No toll to be taken for manure, or for stones to repair the highways. The duke to make weirs, before the boats pass thro' the locks. The next clause directs, that drains, &c. shall be made into the canal, to convey the water from the lands adjoining, and how they shall be maintained. The next impowers bodies politic, &c. to sell, or convey in exchange, lands for the use of the navigation. Trees nor buildings to be set or erected on towing paths, except as excepted, without consent. The next clause impowers owners of lands, near the navigation, to make wharfs, quays, &c. on their own lands. The next limits the breadth of the canal and towing paths, as in the first Act. No more than 6*s.* per ton to be taken for the carriage of goods between Manchester and Liverpool. Lands to revert to the original proprietors if navigation not made through them in ten years, or if made and discontinued in five years. The powers of the former Act extended to this. The works not to be carried through lord Stamford's park without consent, nor nearer the house of the Rev. Mr. Halstead, in Lym, than 50 yards. In an action in any court on this Act, no effoin, protection, &c. &c. nor more than one imparlance shall be allowed, and the Act to be deemed a public Act.

By the above abstracts it will appear, how cautiously the legislature guarded against the infringement of public or private rights, or trespassing upon private property. The Acts are explicit, and full provision is made against any difference that could at



first, or may hereafter arise between the duke and other persons concerned.

Whilst this navigation scheme was on the carpet, much opposition was made by the proprietors of the navigation on the Irwell and Mersey, which gave rise to these queries, tending to shew the disparity between the two navigations.

WHETHER it is not upwards of forty years since the proprietors of the old navigation obtained an Act for making the rivers Irwell and Mersey navigable?

Whether boats can now pass between their lowest lock and Liverpool, without the assistance of a spring tide?

Whether there are not many fords or shallows in it, where boats cannot pass, except in great freshes, or by drawing extraordinary quantities of water from the locks above?

Whether the difficulties and delays attending the use of the old navigation, do not arise from defects in the construction of it, for want of more locks, and not from a scarcity of water?

Whether the new intended navigation will not be nearer by nine or ten miles than the old one?

Whether boats will not be able to pass at all times upon the new intended navigation to and from Liverpool, in the wettest or driest seasons, without obstruction?

Whether there are not upwards of forty tons of goods per week (which will be upwards of 2000 tons per annum) now carried by land between Manchester and Liverpool, at or near the expence of 40s. per ton?

Whether the freight and tonnage upon the old navigation from Liverpool to Manchester does not amount to 12s. per ton, and from Warrington to Manchester to 10s. per ton?

Whether



Whether goods may not be carried, by means of the new intended navigation, from Liverpool to Manchester, for 6s. per ton, and in as short a time, and as certain in the delivery, as by Land-Carriage?

Whether, to encourage the repair of the highways, paving stones and gravel are not proposed to pass upon the new intended navigation, toll-free?

Whether there are any wharfs or quays for landing or securing goods for the use of the public, between Manchester and Warrington?

Whether any quantity of coals, or other goods, have been carried upon the old navigation higher than Warrington Bridge, to supply any part of the adjacent country? And whether, if tonnage upon that river was to be totally remitted, the expence of freight alone would not amount to an exclusion of coals?

Whether, besides the benefit to the trade of Manchester and Liverpool, the new navigation will not produce very great advantages to a considerable part of the county of Chester, in the conveyance of coals and other goods, which are now carried by land for a great number of miles, and cannot be conveyed upon the old river?

Whether the proprietors of the old navigation did not refuse to take any less tonnage from the duke than 3s. 4d. for coals and other goods passing upon it between Barton and Manchester, before his grace attempted to make a separate navigation?

Whether, after the Duke had obtained his first Act, the proprietors did not voluntarily offer his grace the use of their navigation for six-pence per ton, as an inducement to him to communicate his canal with their river? And whether they have not since received from his grace the full tonnage of 3s. 4d. for considerable quantities of timber, plank,



and other things, which he has conveyed upon their river for the use of his navigation?

Whether the springs of water discovered and brought by the duke's foughs out of his own estate, may not be deemed his own property, and disposed of as he shall think fit?

Whether in making the computation of the savings to the public of 10*d.* per ton (being the amount of the reduction of tonnage by the new navigation) there is not a fallacy, as the freight, and not the tonnage, is the great object?

Whether the present freight and tonnage upon deal barks, planks, and many other things, between Liverpool and Manchester, does not amount to 20*l.* per cent. or upwards, upon the value at Liverpool? And whether the reduction of tonnage and freight to half its present price, will not greatly increase the conveyance of oak timber, north country slate, and many other things, and afford a very sensible advantage to those two great towns?

Whether the proprietors of the old navigation do not receive a tonnage \* for goods conveyed upon the river Mersey, between Warrington Bridge and Bank Quay? And whether they have made, or attempted to make, any improvement upon the navigation on that part of the river?

Whether the public is not likely to be better served by having two navigations to resort to, rather than one?

Whether the legislature, by the Act passed forty years ago, intended to grant to the undertakers a monopoly of the water-carriage in that part of the country? And whether the public shall continue to

\* To the word tonnage here might have been added, or wharfage; because in the charge they make they call it wharfage, though no landing on them, but as they take the quays. The foundation of their claim is grounded on their own Bill.



labour under all the disadvantages attending a bad navigation, or receive the benefit now offered them, of a free and open navigation at all times, for the conveyance of goods, in a much shorter time, and at half the present expence of water-carriage, and one sixth part of the present expence of land carriage? And whether, besides the certainty and expedition in the delivery of goods, it will not be the means of extending the trade, and a saving of many thousand pounds a-year, to the public?

## OBSERVATIONS

on the proposed

## NAVIGATION.

The river Mersey, by its communication with the Western Sea, is by nature navigable, in spring-tides, from Liverpool to Warrington-bridge.

By an Act of Parliament, passed in the year 1720, certain undertakers were empowered to make the rivers Mersey and Irwell navigable from Liverpool to Manchester, and to take a tonnage of 3*s.* 4*d.* per ton for all goods navigated between Bank Quay (being near three miles below Warrington-bridge) and Manchester.

The freight and tonnage upon those rivers, between Liverpool and Manchester, is 12*s.* per ton; and between Warrington and Manchester 10*s.* per ton.

The Town of Manchester being supplied with coals by land-carriage, at the expence of from 9*s.* to 10*s.* per ton upon a medium, and there being no communication by water, from any collieries to the rivers Mersey or Irwell above Warrington, the duke of Bridgewater, who has considerable coal mines in his estate at Worsley, about four miles



north of the river Irwell, hath been enabled, by two acts of parliament, passed in the years 1759 and 1760, to make a navigable canal from Worsley mill to Manchester, and to extend a branch of it to Longford bridge, (about three miles from Manchester, upon the great road between that town and Cheshire) and to take a tonnage of 2*s.* 6*d.* per ton.

The applications for these Acts were supported by petitions from several parts of the country; the public utility of the undertakings never controverted, and the practicability is fully evinced, by compleating the navigation from Worsley over the river Irwell to Longford bridge, and within two miles of Manchester.

The duke is now proceeding in the further execution of the navigation; and, in order to drain and convey his coals from the mine, is driving up a subterraneous fough upon the level of his canal, which communicates with it, and carries boats of six or seven tons burden.

It is found, upon proper surveys, to be practicable to extend this navigation from Longford bridge through a populous part of the county of Chester to communicate to the river Mersey at the Hempstones, above eight miles below Warrington bridge, from whence there is a natural tide-navigation to Liverpool; and the duke is willing to make this extension, without any further tonnage than the 2*s.* 6*d.* granted by the former Act; But to this scheme many objections have been made.

*Objection I.*

That the land-owners will suffer by having their lands cut through and separated, and that a great number of acres will, by this new navigation, be covered with water, and for ever lost to the public.

*Answer.*



*Answer.*

Full compensation is to be made for all lands before they can be used for the purposes of the bill, and for all consequential and unforeseen damages; and the duke is obliged to provide proper bridges, and other conveniencies, for the accommodation of the owners and occupiers of lands.

With respect to the loss of lands, by a number of acres being covered with water, whoever knows the great extent of moss and barren land through which the intended canal is to be cut, and has seen the methods practised upon the duke's canal, already finished, by back-drains and aqueducts made under the canal, will be perfectly satisfied, that the lands in general will be drained, and greatly improved, and the back-drains will entirely prevent any prejudice from the ouzing through the banks; and satisfaction for any particular and temporary damage, it is presumed, is fully provided for: and the admission of all sorts of manure, tonnage free, will furnish an additional means of improvement to the land owners.

*Objection II.*

That there is no necessity for this new navigation, as the old one upon the rivers Mersey and Irwell is compleat, and sufficient to answer all the purposes of the public, and to carry more goods than the present trade will supply.

*Answer.*

The old navigation is very imperfect, expensive, and precarious, as no vessels can be brought up from the Hempstones into their first lock above Warrington bridge but at spring-tides, there never having been any attempt to improve that part of the navigation; and between that place and Manchester there are many shallows, which it is very difficult



difficult to pass with loaded vessels, and in times of floods the whole is impassable.—These defects occasion great delays and uncertainties in the delivery of goods, which are very inconvenient to trade, and lay the merchants under a necessity of sending very great quantities of goods weekly between Manchester and Liverpool by land-carriage, at the expence of 30s. or 40s. per ton.

The duke's new intended navigation will be above nine miles nearer than the old one, and passable at all times, there being a sufficiency of water at the Hempstones to bring up boats of 40 or 50 tons burthen at the lowest neap tides; the passage from thence to Manchester will be easy and secure, as there will be no shallows or streams to contend with, or floods to obstruct it; and by means of this navigation, goods will be carried from Manchester to Liverpool for 6s. per ton, including freight and tonnage; which, besides the great advantage of expedition and certainty in the delivery, will save one half of the present expence, upon all goods carried by water between Liverpool and Manchester, (that is to say, at the rate of 6s. instead of 12s.) and above four fifth parts of the present expence upon that great quantity of goods now necessarily carried by land, (that is to say, at the rate of 6s. instead of 30 or 40s.) and be the means of conveying many useful commodities, such as coal, timber, slate, stone, and many other things of small value, which cannot afford so great an expence as 12s. per ton.

*Objection III.*

That the new navigation runs parallel with, and in many places very near, the old one, and can therefore extend no advantage to the public but what they already receive from the old navigation.

*Answer,*



*Answer.*

The old navigation affords little or no advantage to the country through which it runs, the freight and tonnage being so heavy, and the course of it being in deep low ground, accessible but in few places, and there not being a wharf or quay between Manchester and Warrington-bridge, which is upwards of 26 miles by water.

Although the duke's navigation may, in some parts, run parallel with the old one between Manchester and the Hempstones, yet, for the greatest part of its course, it will be two, three, or four miles from it, and the communication with the adjacent country more easy, as it will be made on higher ground than the old navigation, and cross many public highways which do not lead to it, and will save a land-carriage of nine or ten miles for many hundred tons per week, passing between Cheshire and Manchester.

From Worsley to Altrincham, the new navigation will lie in a different direction to the old one, as it will be carried over the rivers Irwell and Mersey, and will save a land-carriage of many thousand tons of coals every year, for upwards of thirteen miles, through bad roads, to supply the inhabitants of that part of the county of Chester, which borders upon the county of Lancaster.

These are advantages which the country can in no wise receive from the old navigation.

*Objection IV.*

That the water which is to supply the new navigation, is proposed to be taken from the old rivers, and will be a great prejudice, if not a total obstruction of the old navigation in dry seasons.

*Answer.*

The duke cannot take any water, either from the Irwell or Mersey, into his navigation, as both  
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those rivers lie considerably below the level of his present and intended canal.—His Grace's present canal is chiefly supplied with two streams of water flowing from springs cut by him and his ancestors in the bowels of their estate, by driving up foughs to drain the mines, and the waters from thence are still increasing by the progress of the works, the deepest of those foughs being now carrying on with great expedition; which waters, it is apprehended, may with great propriety be called his own, and which at present will be sufficient to fill upwards of 18 locks in 24 hours, being many more than is requisite to answer all the trade that the country can possibly supply on both navigations.

By measuring and comparing the quantities of water used in the old and new navigation, the disproportion will appear so great, that if the quantity used in the new one was to be added to, or diverted from the old one, it would not vary the perpendicular depth a fortieth part of an inch, and could make no sensible difference in the navigation of vessels; at the driest seasons the waters from the duke's foughs and springs producing above 66 cube feet per minute, and the waters in the Irwell and Mersey producing, in the driest seasons, 7700 cube feet per minute, as appears from the most accurate measures and observations which have been taken.

But in order to preserve the due circulation of water in the canal, and to supply any loss which may be sustained by leakage in the course of that work, it is proper that power should be given to the duke to make use, if necessary, of contiguous streams. Yet the exercise of this power cannot be detrimental to the old navigation, as supposing no leakage, the waste waters, which by the bill are directed to be turned into the river, will not only be equal to the streams and waters so taken in, but increased  
by



by the above surplus of the water produced by the foughs and springs; and all this water will be also let off into the river at as high, and in most cases a higher level than the streams and waters, if not so diverted, would in their natural course fall in. And supposing a leakage, yet the old navigation cannot be prejudiced, as the water carried off by such leakage will naturally find its way into the bed of the river: But as the duke is desirous that every necessary provision should be inserted in the bill for obliging him to make a full and ample satisfaction to the proprietors of the old navigation, and all other persons, for any damage they may sustain by the loss of the water to be so diverted; it is apprehended, there cannot remain the least shadow of an objection.

*Objection V.*

That as the proprietors of the old navigation have advanced large sums of money, and as they undertook it upon the faith of parliament, they have acquired such a property in it as ought not to be taken from them, without a full compensation.

*Answer.*

The parliament, in passing the act for the old navigation, had only in view the advantage of the public, and could not mean to give the undertakers an exclusive right to this mode of carriage, if a better and more advantageous conveyance could be afterwards found.—The undertakers were voluntary adventurers: They were for many years disappointed in their expectations: Several who had advanced money thought proper to forfeit the sums paid, rather than hazard a further disbursement; and others, who had compleated their payments, amounting to about 41*l.* per share, sold out at 12*l.*—At last, a sort of navigation was compleated, after eighteen years had elapsed: a navigation



gation tedious, expensive, and liable to great interruption: a navigation in which the hopes of the legislature, and the expectations of the public, and the undertakers, were in a great measure baffled: a navigation, the defects whereof a turnpike road was made to supply.—Meritorious as the first design might have been, the difficulties in the execution, and in the use of it, plainly demonstrate it to have been a mistaken, or an ill-executed scheme. And is the public to be denied a more expeditious, safe, and, in every respect, a better navigation, because this was attempted? and not to have the advantage of carriage for 6s. per ton, because the proprietors of the old navigation cannot carry for less than 12s.?

Though they have been in possession of this river above 40 years, and the use of the navigation above 20 years; and though they are in the greatest apprehension of ruin from the proposed scheme, (the strongest proof of its utility) they may, if that scheme was to take effect, have 30l. for every share, that originally cost about 41l. And if their dividends have not, in so many years, made up to them considerably more than the difference, with the interest upon the whole, it is submitted, If that is not a very striking proof, that their undertaking has been of very small importance in this manufacturing country.

The creditors upon turnpike acts are adventurers, with respect to the money advanced, in the same manner as the undertakers of navigations.—They are merely adventurers, without having the advantage of making the roads in the cheapest manner, placing the turnpikes, or collecting the tolls, and without any chance of benefit from the increase of trade. They hazard the whole, and can only receive a certain stipulated interest, with the principal.—



pal.—The undertakers of navigations have the direction of the works, the collection of the tonnage, and all the advantages that may arise from an increase of carriage.—At the head of artificial navigations, made under the authority of parliament, warehouses have been erected, and wharfs provided, at a great expence, for the benefit of navigation: and yet parallel turnpikes have been made, whereby the security of the creditors of the former turnpikes have been much endangered; and navigations have been extended, whereby such warehouses and wharfs have been in a great measure rendered useless, without any compensation being directed to be made by parliament, for any damages they might sustain by the execution of those new laws, calculated for the benefit of the publick.

This mode of navigation is new in its kind; and, from the experiments already made, carries the most promising appearance of success; and may, if the completion thereof is allowed, be the means of introducing into many other trading parts of the kingdom, a more easy, cheap, and expeditious conveyance than can otherwise be obtained.

New schemes and proposals have, from the novelty of the thing, or the local and particular interests of private persons, frequently met with difficulties and obstructions: but it is unnecessary to enumerate the great advantages that have accrued to the trade and commerce of this kingdom, from the attention and encouragement the legislature hath, for many years, given to every attempt where publick utility was the object.

During the dispute, a merchant in Warrington wrote as follows, addressed

TO



TO THE  
GENTLEMEN AND TRADESMEN  
AT WARRINGTON.

The esteem and value I always entertained for the commercial interests of our country, are motives sufficient to justify me, for addressing you in this public manner, and (especially) upon an affair wherein we all stand immediately interested.

We see (amidst the horrors of a long and expensive, yet successful war) our wise legislature, still attentive to the enlargement of our trade, and ever ready to forward all proper means for its future extension.

Amongst the many schemes of this nature, (that are now under the consideration of the honourable house of commons) there is none affords the prospect of greater public utility, than the canal intended to be cut through part of Cheshire, by his grace the duke of Bridgwater, to fall into the river Mersey, near Runcorn: A design this! so public-spirited, that justly demands our gratitude and closest attention; for, if carried into execution and completed, it will certainly (in time) be the means of opening a trade, by an inland navigation, from the Western to the German Ocean, which the present age may possibly see, but posterity will experience the beneficial effects of, and speak with honour of the noble patriot who first commenced the design.

But such is the infelicity and waywardness of human nature, acting under the influence of passion or prejudice, that however laudable the schemes proposed



ed may be, they do not always meet with unanimous approbation, but are often more foolishly rejected than wisely considered; for the bulk of mankind (and especially those in power) we often see, are blinded and infatuated by self-interest, determined to look no farther than the present time, to banish all regard to posterity; thus ruining the public weal by obstinacy or inattention, or the meaner motives of local considerations; in some of these characters we may, however, observe designing men, who have art and cunning sufficient to conceal their views, and either by an undue influence, or by delusive and false reasoning, mislead and pervert the judgment of others, by pointing out to them the most terrible consequences, that have no other foundation than their own conscious and guilty fears suggest.

Something like this seems now to be the case, and is giving birth to an ill-timed petition, intended to be offered you to sign, to give it (if not the reality) at least the appearance of popular sanction, which, if complied with by the public, will afterwards be transmitted to the house of commons. There is no doubt it will be proposed with plausible arguments to alarm your fears; but judge for yourselves, and reject it, for it is solely calculated for the interest of a junto of the old Navigators, who never shewed themselves in any instance (as a connected body) either candid or ingenuous to individuals, or friends to the public, but, on the contrary, oppressive in all their measures.

Permit me then to remind you to be upon your guard, consider coolly what you are about, think of men and times past, examine whence this petition comes recommended, and you'll find it to be at the appointment (perhaps the modest request, or rather, the awful and powerful sanction) of the truly honourable body of the Manchester Navigators.

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I might have spared the compliment, for trees are known by their fruits, and none can be mistaken in their judgments of the uprightness of these gentlemen's intentions; their past conduct betrays them, the facts are recent, witness their attempt when Sankey-wharf was first erected, their stoppage of vessels and goods on the most base and frivolous pretences, their long extravagant freights, tonnage, wharfage, &c. though of late they have received some little check: but should these men now succeed in the designs they have in view, (flushed in triumph) they will rejoice in public disappointment.

Power, therefore, in such hands, is dangerous, and no confidence ought to be placed in persons, whose avowed maxims have always been (for years past) a continued series of oppression and monopoly, a constant invasion of private right and property, an injury to trade by arbitrary and unreasonable burdens imposed upon the private traders, (who latterly have been somewhat eased;) but still there are grievances which loudly call for redress, and the present opportunity should not be lost. Suffer me, therefore, (my friends) from motives to the public good, from a regard to our common interest, to request of you not to sign any instrument, that will have the least tendency to render unpopular those laudable purposes the duke hath in view; and be assured, that all objections hitherto offered against the new canal, are not upon the general principles by which society (and particularly a trading people) should direct their conduct, but they are founded in self-interested motives and local views, wholly designed for the meridian of the Manchester confederacy, and if possible to lull your attention, the better to perpetuate their usual schemes of oppression. Let then this maxim be adopted by you, viz. that every  
increase



increase of navigable canals through a country, must extend its commerce, by facilitating the conveyance of wares and merchandizes, as well as timber for ships, the basis of our naval strength, and the only means by which our trade must be maintained, therefore cannot fail of being publicly beneficial, not to mention the improvements in agriculture, by enhancing the value of lands, which the gentlemen of that interest would do well to consider.

The arguments offered by the emissaries of the Navigators, against the duke's bill, appear at first view striking and popular, but when considered, are mere chicane and sophistry. The legislature (it is true) granted to the old proprietors, a liberty to make the river Mersey navigable to Manchester; they have endeavoured to do it, tho' they have not compleated the same in its fullest extent, (for what reason the present managers best know;) but the legislature did not engage, at the same time, that in case of their failure in perfecting the design, every other proposal should be discouraged that would be more effectual; for, the end of all bills of this kind being the public utility, therefore, when the means used have not been conducive to that end, it is not reasonable that the public trade should suffer, because a few individuals have mistaken the object, and, to make themselves amends, stretch every nerve of power to oppress that trade, which the design of the first grant was to extend and open.

I flatter myself, that sufficient hath been offered, to influence every disinterested person, from signing any petition for the present, since they (perhaps) will have reason to repent it, especially when (it is with pleasure) I can assure them, that numbers of our friends have determined to unite, and to pursue



such steps, as to shake off the present vassalage, by seeking effectual means to support the freedom of the natural tide-navigation, we already have, and to claim the same, to its old and lawful limits, free and open as nature intended, and what right and equity justly demand. This, it is to be hoped, will excite your attention, and I trust will not only merit your warmest wishes, but the utmost exertion of your proper powers for its success.

I remain, gentlemen,

Your friend,

Dec. 21, 1761.

JOHN HART.

A PARTICULAR ACCOUNT OF THE  
DUKE OF BRIDGWATER'S  
NAVIGATION.

*In a LETTER to the Printer of the St. JAMES'S  
CHRONICLE.*

SIR,

*Manchester, Sept. 30, 1763.*

'Tis not long since I viewed the artificial curiosities of London, and now have seen the natural wonders of the Peak; but none of them have given me so much pleasure as I now receive in surveying the duke of Bridgwater's navigation in this country. His projector, the ingenious Mr. Brindley, has indeed made such improvements in this way, as are truly astonishing. At Barton bridge he has erected a navigable canal in the air; for it is as high as the tops of trees. Whilst I was surveying it with a mixture of wonder and delight, four barges passed me in the space of about three minutes, two of them



them being chained together, and dragged by two horses, who went on the terras of the canal, whereon, I must own, I durst hardly venture to walk, as I almost trembled to behold the large river Irwell underneath me, across which this navigation is carried by a bridge, which contains upon it the canal of water, with the barges in it, drawn by horses, which walk upon the battlements of this extraordinary bridge. This navigation begins at the foot of some hills, in which the duke's coals are dug, from whence a canal is cut through rocks, which day-light never enters. By this means large boats are hauled to the innermost parts of those hills, and being there filled with coals, are brought out by an easy current, which supplies the whole navigation, for the space of about ten miles. At the mouth of the cavern is erected a water-bellows, being the body of a tree, forming a hollow cylinder, standing upright: Upon this a wooden basin is fixed, in the form of a funnel, which receives a current of water from the higher ground. This water falls into the cylinder, and issues out at the bottom of it, but at the same time carries a quantity of air with it, which is received into tin pipes, and forced to the innermost recesses of the coal-pits, where it issues out, as if from a pair of bellows, and rarifies the body of thick air, which would otherwise prevent the workmen from subsisting on the spot where the coals are dug.

From Barton I steered my course towards this place, and in my way saw the navigation carried sometimes over the public roads, and in some places over bogs, but generally by the side of hills; by which means it has a firm natural bank on one side, while the other, composed of earth and gravel thrown up, is about eight yards broad. At proper distances, foughs are formed near the top of the ca-

nal, which prevents it from overflowing during immoderate rains.

In some places, where Mr. Brindley has been forced to carry his navigation across a public road, being obliged to keep the water on a level, he has sunk the road gradually, so as to pass under his canal, which forms a bridge over the road; the carriages, by an easy descent, going down on one side, and by the same easy ascent, coming up again on the other. Near this town, where Cornebrook comes athwart the duke's navigation, the current of the brook is stopped, and let into a large basin, from whence it falls gradually into a smaller one that is within it, and is open at the bottom; by which means the water sinks into a drain, and is conveyed under-ground to the other side of the canal, where it rises into its old channel.

At this place, which is about a mile from Manchester, the duke's agents have made a wharf, and are selling coals at three-pence halfpenny per basket, which is about seven score weight; and next summer they intend to land them in this town.

Many gentlemen of this neighbourhood are reaping the benefit of Mr. Brindley's inventions; he having taught them a method of draining coal-pits by a fire-engine, constructed at the expence of 150*l.* which no one before knew how to make at less than 500*l.* In these he uses wooden chains, which are preferable to iron ones, and cylinders made of deal, which supply the place of those which were usually made of cast iron. Channels are now cutting also in many other coal-pits, and boats are used instead of sledges, to convey the coals to the mouths of the pits.

I am yours, &c.



## A SECOND LETTER.

S I R,

*July 1, 1765.*

I now send you some additional observations on the duke of Bridgwater's extraordinary navigation, which I made yesterday at Stretford, where I found four hundred men at work, (though it was Sunday) in putting the finishing stroke to about two hundred yards of the canal, which reached nearly to the Mersey; and on drawing up the flood-gates, was to receive last night a proper quantity of water, with a number of loaded barges, and some things which I can ill describe. One of these appeared like the hull of a collier, with its deck all covered after the manner of a cabin, and having an iron chimney in the center; this, on enquiry, proved to be the carpentry, but was shut up, being Sabbath-day, as was another barge, which contained the smith's forge. Other vessels were loaded with soil, which was put into troughs, fastened together, and rested on boards that lay across two barges; between each of these was room enough to discharge the loading, by loosening some iron pins at the bottom of the troughs: other barges lay loaded with the foundation stones of the navigation canal, or bridge, which is to hold the duke's barges of coals and merchandize, intended to be carried across the Mersey. Near two thousand oak piles are already driven to strengthen the foundation of this bridge. The carpenters on the Lancashire side were preparing the center frame; and on the Cheshire, all hands, and, I may say, all the water, at work in bringing down the soil, and beating the ground adjoining to the foundation of the bridge, which is designed to be covered with stone in a month, and finished in ten days more.

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I surveyed the duke's men for two hours, and think the industry of bees, or labour of ants, is not to be compared with them. Each man's work seemed to depend, and be connected with his neighbour's, and the whole posse appeared, as I conceive did that of the Tyrians, when they wanted houses to put their heads in, and were building Carthage.

This bridge, when finished, will unite the Lancashire and Cheshire parts of the duke's navigation, and next year he will be able to sell coals at Dunham in Cheshire. He has finished the cut quite across Sale Moor \*, and will soon compleat it over the meadows on each side of the River Mersey; the entrance of which, from the low and boggy situation, was, by men of common understanding, deemed his *ne plus ultra*. At this place, Mr. Brindley caused trenches to be made, and placed deal barks in an erect position, backing and supporting them on the outside with other barks laid in rows, and screwed fast together; and on the front side he threw the earth and clay, in order to form his navigable canal. After thus finishing forty yards of his artificial river, he removed the barks, and placed them again where the canal was designed to advance. In order to feed that end of the navigation which is near Manchester, he has

\* From this place the duke designs to cut a new branch of navigation, which will extend to Stockport, and give the tradesmen of that place the advantage of receiving by water-carriage, the heavy goods which they buy in London, and which are from this town conveyed to several parts of Cheshire, Yorkshire, and Derbyshire. In return the vessels may be loaded with wheat, malt, cheese, timber, lead, and the materials for the several manufactures carried on in the town and neighbourhood of Stockport. By this branch of navigation the manufacturers of Sheffield may send their goods to Liverpool, Scotland, and Ireland; and as returns receive elephants teeth, hides, horns, &c.



raised, and, as it were, swallowed up the river Medlock, where he last year erected some stone-works; and in order to keep its bed dry for his workmen, he turned off the chief part of the water by a cut through the rock, and invented an engine called a spoon, which he worked at the end of a lever, by a horse. When this spoon dips into the water, a kind of flap-door, made of leather, is pressed open, and admits the water till full, and on being weighed up, the pressure of the water within closes the door, and as the lever rises, it runs off into a channel cut at the end of the spoon handle. From the wharf, at this place, the poor of Manchester fetch great quantities of coal in wheel-barrows; and Mr. Brindley, in order to remove the inconvenience of carrying them up Castle-hill, is driving a large tunnel through the centre of this hill, into which he intends to introduce his barges, and by a crane, which is to be worked by a box-water-wheel, he proposes to land the coals close to this town. That branch of the canal which is finished, and on which coals are already brought to Manchester, is about ten miles long, and the Cheshire branch already finished is about nine miles, which is computed to be executed, on an average, at one thousand guineas a mile; from which I may venture to prophesy, that though this be the first still navigation in England, it will not be the last, as by this means a communication may be made with most rivers; and trading towns may now have navigations far superior to those of rivers, made by little more than the waste water that runs from their pumps, &c.

T. L.

A SECOND ACCOUNT OF THE  
NAVIGABLE CANAL.  
IN A LETTER FROM BIRMINGHAM.

S I R,

There is a predominant principle in human nature, which has been little attended to by philosophers; but into which, nevertheless, many of our passions may, without refinement, be resolved. The principle I mean is curiosity. It is a principle which displays itself the first moment we behold the light; it attends us through every stage of our being, and does not quit us till our latest breath. It is this which makes the new-born infant gaze at the bright flame of a taper, or listen to the jingling of a coral. It is this which, in riper years, makes the fickle libertine rove from Lais to Lycetta, and from her to Messalina. It is this which makes decrepitude fond of life, when every sensation is benumbed, and every appetite extinct. And it was this which made the dying Solon solicitously enquire what his friends were whispering about.

There is a rational as well as a ridiculous curiosity: and it is a principle either useful or injurious, according to the bent of different dispositions. In weak minds it is the source of levity and inconstancy, and the guide to every mode of dissipation; but in noble minds it is the parent of industry, and the handmaid to every useful knowledge.

It is observable, that the power of this principle increases in proportion to the difficulty of its gratification, and the distance of the object it pursues. Many wish to see the broken pillars of a Roman Circus, who would pass by the noblest piece of ruins in their own country with a vacant eye: and some  
perhaps



perhaps languish to behold the vast pyramids of Egypt, and the Libyan deserts, who would be regardless of the wild and awful scenes of Nature at Landrindod or at Matlock.

I have been led into this train of reflection by a tour which I lately made into Derbyshire, and the neighbouring counties, which are replete with subjects of rational curiosity. But what mostly engaged my attention, and what best deserves the notice of an intelligent observer, is the navigation made by his grace the duke of Bridgwater, in Lancashire. This navigation, which was begun about six years ago, bears vessels of sixty tons burden, and is carried over two navigable rivers, the Irwell and Mersey; and to see vessels passing both over them and upon them, at the same time, affords a most curious and pleasing prospect.

The fough, or addit, which was necessary to be made, in order to drain the water from the coal mines, is made navigable for boats of six or seven tons burden, and forms a kind of subterraneous lake, which runs about a mile and a half underground, and communicates with the canal. This lake, which leads to the head of the mines, is arched over with brick, and is just wide enough for the passage of the boats: at the mouth of it are two folding doors, which are closed so soon as you enter, and you then proceed by candle-light, which casts a livid gloom, serving only to make darkness visible.

But this dismal gloom is rendered still more awful by the solemn echo of this subterraneous lake, which returns various and discordant sounds. One while you are struck with the grating noise of engines, which by a curious contrivance let down the coals into the boats: then again you hear the shock of an explosion, occasioned by the blowing up the hard rock, which will not yield to any other force than  
that

that of gunpowder. The next minute your ears are saluted by the songs of merriment from either sex, who thus beguile their labours in the mine.

When you have reached the head of the works, a new scene opens to your view. There you behold men and women almost in the primitive state of nature, toiling in different capacities, by the glimmering of a dim taper; some digging the jetty ore out of the bowels of the earth; some again loading it into little waggons made for the purpose; others drawing those waggons to the boats.

To a superficial observer, such scenes serve only to amuse the sight by their novelty; but to a reflecting mind they afford ample matter of instruction.

When we behold a part of our species deprived of sunshine, the common inheritance of mankind, and buried in a dismal and confined cavern, in which they can scarce rear their form, our feelings prompt us to pity their condition; but when we observe the lively ray of cheerfulness break forth in this scene of darkness and distress; when we behold the glow of health in the midst of damp and suffocation; we then cease to pity them, and begin to examine ourselves: we then discover that our enjoyments above ground serve only to multiply our wants; and we are convinced of the truth of that maxim, which assures us, that happiness is *every where or no where*.

I have hitherto considered these works merely as subjects of curiosity; but what mostly recommends them, is their extensive utility. The navigation has already been of great benefit to the town and neighbourhood of Manchester, by reducing the price of coals to near one half less than was usually paid; the poor in particular reap vast benefits from it, as coals are retailed to them in such small quantities as 100 weight, at the rate of  $3\frac{1}{2}d.$  per hundred. It has likewise afforded great improvement to the lands through



through which it has been cut, by means of the subterraneous drains which have been made to convey the waters under the canal; and it will in a short time effect great improvement in a large track of moss land, which yields no profit at present. Add to this, that it has proved very beneficial to the tenants of the adjacent lands, by means of the great quantity of marl which has been discovered, and given to them.

When the navigation shall be extended to Liverpool, whither it is expected to be carried in about four or five years, the towns and neighbourhood of Liverpool and Manchester will have the benefit of boats passing every day between the two places; and they will reap the farther advantage of having their goods carried for 6s. per ton; whereas they now pay 10 or 12s. per ton, water-carriage; not to mention, that from the difficulty and uncertainty of the passage, great quantities of goods are sent by land, at the expence of about 40s. per ton.

Such are the advantages already attending, and which are farther to be expected from, this noble undertaking, and which has thus been expeditiously and successfully conducted, under the care of two ingenious gentlemen, whose works sufficiently evince their \* merit. But it would be unpardonable to withhold the praise so justly due to the noble duke who called their merit forth; and who, at an age too often spent in riot, or at best perhaps in futile dissipation, applied his attention to useful objects, and had the spirit to hazard so great a part of his

\* I must not omit to observe, that in digging the canal, a kind of sand or gravel was found, which, after repeated experiments, was discovered to be lime; and so good a method of burning it was contrived, that it has been made to supply all occasions hitherto, which have been very great, and has saved many thousand pounds, as lime must have been brought near thirty miles, if this discovery had not been made.

fortune

fortune in an undertaking worthy the pursuit of a prince; and which is now likely to prove profitable to himself, as well as beneficial to his country.

When the influence of exalted rank, and the power of large possessions, are thus nobly and usefully exerted, they confer additional lustre on the possessor: and such a laudable application of the gifts of fortune is so rare, that it ought not to pass unnoticed. It is to be hoped that his grace's noble example will be followed by others, in such parts of the kingdom where inland navigations may be made for the improvement of trade and commerce: and it is with pleasure we hear, that a scheme is in agitation for opening a communication between the two ports of Liverpool and Hull, which will not only be of great immediate benefit to this and other trading towns in the adjacent counties, as well as to the public in general, but may hereafter be made the means of infinite local as well as national advantages, by branches which may be extended to several parts from the main trunk.

I am, &c.

### A THIRD ACCOUNT OF THE DUKE OF BRIDGWATER'S NAVIGABLE CANAL.

At Worsley-Mill, seven computed miles from Manchester, is the duke of Bridgwater's Tunnel, a subterraneous navigation that leads to the coal mines; the first entrance for 1000 yards is six feet and a half wide, seven feet and a half high, including the water, which is three feet four inches deep; it is already continued 500 yards further, ten feet wide,



wide, the same height, in a direct line, and will be extended at least a mile and a half more; the boats employed therein are forty-seven feet long and four feet and a half wide, including the gunnels; they draw, when loaded, two feet six or seven inches, and carry from seven to eight tons; there is a rail on each side, by which the boats are towed or pulled by the hand; and being linked together, are brought out of the tunnel from six to twenty at a time. A boy of seventeen has worked twenty-one, which at seven tons each (the lowest burthen) makes 147 tons; they are from thence drawn by mules or horses to Manchester and other places, generally four or six in a gang; there is also a mill that by a small overshot stream turns a wheel eight yards diameter, and by that power, three pair of stones to grind corn, and an apparatus compleat to make mortar; also portable cranes of an uncommon construction, to draw stone out of the quarry with callipers.

Near the same place is found a stratum of the quality of lime, which being mixed with clay, and formed into bricks, is burnt, and a very useful mortar is made of it.

At Barton Bridge (three miles) the aqueduct upwards of 200 yards, which conveys the canal across a valley, and rides 38 feet above the navigable river Irwell; there are also stops at each end, which may occasionally be drawn up, and let off the whole body of water; this is easily done, by drawing a plug, and discharging the water into the Irwell through a wooden tube.

It is to be observed, that there are many of these stops or flood-gates so constructed, that should any of the banks give way, and thereby occasion a current, they will rise by that motion, and prevent the damage that would otherwise happen by overflowing the country.

At

At Stretford, three miles off, is the caisson, 40 yards long by 32, also open-bottomed boats; their use is to discharge their burthens of earth, and thereby raise the ground where the level requires it; these are always employed in the caissons, as the ground they pass over lies above 16 or 18 feet below the surface of the canal; they carry about 16 or 18 tons, which is with great ease dropped in an instant where wanted.

At Cornbroke, three miles, is a circular wear to raise the water of the canal to its proper height: the overplus flows over the extreme sides into a well in the nave of the circle, and by a subterraneous tunnel is conveyed to its usual channel; also a machine to wash the slack, worked by water.

*Note,* The centre arch at Barton Bridge that carries the aqueduct is 63 feet, and on the pier between the great arches are 96 central arches.

On the side of Castlefield is a large wharf, and a larger one intended to be in the centre of this field, formerly a Roman camp. There is a large and beautiful wear, composed of six segments of a circle, the whole circumference 366 yards, which acts by the river Madlock, in the same manner as that at Cornbroke, to supply the canal. There is a large tunnel in Castlefield, under the hill, in which will be a bucket-wheel, 30 feet circumference, and four feet four inches wide, to draw up the coals brought in boxes fixed in the boats, and contain about eight hundred each; and when discharged, will be landed where the way to Manchester is so level, that a good horse may easily draw one ton to any part of that town.

Manchester, August 1, 1765.









A FOURTH ACCOUNT OF THE  
DUKE'S NAVIGATION.

In a LETTER to a LADY.

MADAM,

This waits on you with an account of the duke of Bridgwater's magnificent work near Manchester, which is, perhaps, the greatest artificial curiosity in the world; crowds of people from all parts resort to it, and persons of high rank express their admiration of it.

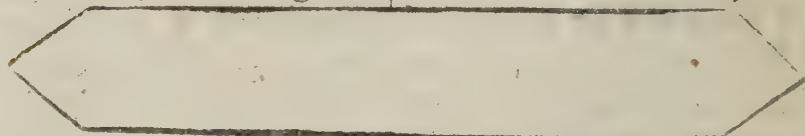
This is a new canal, and I know not what to call it besides, constructed, as it should seem, to convey coals out of a mine to Manchester and other places; but is capable of being applied to more considerable purposes.

This stupendous work was begun at a place called Worsley Mill, about seven miles from Manchester; where, at the foot of a large mountain, the duke has cut a basin capable of holding all his boats, and a great body of water, which serves as a reservoir, or head, to his navigation; and in order to draw the coals out of the mine, which runs through the hill to an amazing extent, his grace has cut a subterraneous passage, big enough for long flat-bottomed boats to go up to the work, and has so preserved the level, that a part of the water, which drives a mill near the mouth of the passage, runs in, and stands to the depth of about five feet. This passage also serves to drain the coal mines of that water which would otherwise obstruct the work, and is to be carried on three miles or more underground.

Having obtained a ticket to see this curiosity,  
E which

which is done by sending your name to a new house which the duke has lately built for his residence, at about half a mile distance, you enter with lighted candles the subterraneous passage in a boat, made for bringing out the coals, of this form and dimension ;

Fifty feet long, four and an half broad,



Two feet three inches deep.

When you first enter the passage, and again when you come among the colliers, your heart will be apt to fail you : for it seems so much like leaving this world for the regions of darkness, that I could think of nothing but those descriptions of the infernal shades which the poets have drawn for Ulysses, Æneas, and your old friend Telemachus. There is more civility, however, in this region, than Homer, Virgil, and Fenelon, have discovered in theirs ; for, should your spirits sink, the company are ever ready to aid you with a glass of wine : even Charon himself will offer you a cup on the occasion.

Through this passage you proceed, towing the boat on each hand by a rail, to the extent of a thousand yards, that is, near three quarters of a mile, before you come to the coal works ; then the passage divides, and one branch continues on a straight line among the coal works three hundred yards further, while another turns off, and proceeds three hundred yards to the left ; and each of them may be extended farther, or other passages be conveyed from them to any other part, as the mines may run, and necessity require. Hence you will perceive, that those who go up both passages, travel near three miles



miles under ground before they return. The passages in those parts where there were coals, or loose earth, are arched over with brick; in others the arch is cut out of the rock.

At certain distances there are, in niches, on the side of the arch, funnels or openings through the rock to the top of the hill, (which is in some places near thirty-seven yards perpendicular,) in order to preserve a free circulation of fresh air, as well as to prevent those damps and exhalations that are often so destructive in works of this kind, and to let down men to work in case any accident should happen to the passage. Near the entrance of the passage, and again further on, there are gates to close up the arch, and prevent the admission of too much air in tempestuous and windy weather.

At the entrance the arch is about six feet wide, and about five feet high from the surface of the water; but as you come further in it is wider, and in some places opened, so that the boats, that are going to and fro, can pass each other; and when you come among the pits the arch is ten feet wide.

The coals are brought from the pits to this passage, or canal, in little low waggons, that hold near a ton each, and as the work is on the descent, are easily pushed by a man, on a railed way, to a stage over the canal, and then shot into one of the boats already mentioned, each of which holds about eight tons. They then, by means of the rails, are drawn out by one man to a basin at the mouth of the passage, where four, five, or six of them are linked together, and drawn by one horse or two mules, by the side of the canal, to Manchester, or other places where the canal is conveyed.

There are also, on the canal, other broad boats, that hold about fifty tons, which are likewise drawn by one horse. Of the small boats there are about

fifty employed in the work, and of the large ones a considerable number.

Before we quit the coal mines, to speak of the open canal and its conveyance, we must take some notice of a mill near the mouth of the passage, and which, though an overshot mill, is so well contrived as to work three pair of grinding stones for corn, a dressing or boulding mill, and a machine for sifting sand and compounding mortar for the buildings. The mortar is made by a large stone, which is laid horizontally, and turned by a cog-wheel underneath it, and this stone on which the mortar is laid, turns in its course two other stones that are placed upon it obliquely, and, by their weight and friction, work the mortar underneath, which is tempered and taken off by a man employed for that purpose. The boulding mill is also worthy notice. It is made of wire of different degrees of fineness, and at one and the same time discharges the finest flour, the middling sort, and the coarse flour, as well as the pollard and the bran, and without turning round, the work being effected by brushes of hogs bristles within the wire.

From the basin we have been speaking of, the canal takes its course to Manchester, which is nine miles by water, though but seven by land, the other two miles being lost in seeking a level for the water. The canal is broad enough for the barges to pass, or go abreast, and on one side of it there is a good road made for the passage of the people concerned in the work, and for the horses and mules that draw the boats and barges. To perfect this canal without impeding the public roads, or injuring the people in the country, the duke has in many places built bridges to cross the water, and (where the earth was raised to preserve a level) arches under it; all of which are built chiefly of stone, and are both  
elegant



elegant and durable; but what principally strikes the common observer, is the work which is raised near Barton Bridge, to convey the canal of water over the Irwell, which makes a part of the old navigation from Manchester to Liverpool. This is done by means of three arches built of stone, which are so spacious and lofty as to admit of the vessels sailing underneath it; and it is indeed a most noble sight to see large vessels in full sail under this aqueduct, and the duke's vessels sailing at the same time over all, and near fifty feet above the navigable river. (See the frontispiece.) At convenient distances there are, by the sides of the canal, receptacles for the superfluous water; and at the bottom of the canal machines constructed on very simple principles, and placed at proper distances, to stop and preserve the water in case any part of the bank should happen to break down. The aqueduct is perfected as far as Manchester, where coals are brought from the mine in great plenty, and another large basin is making for the reception of the vessels employed in this work.

Besides this, there is another canal, which takes its rise from that we have described, near Barton Bridge, and goes to Stretford, and from thence will be probably extended on the Cheshire side of the river Mersey as far as Liverpool, and if so, what a most noble convenience will this be for travellers.— We should then travel with as much safety, certainty, and dispatch, as in the trachtschoots in Holland and Flanders; and in the same manner; for, as here is no current to impede the vessel, one horse will draw fifty ton of coals after the rate of four miles an hour; and would trot with a light boat and passengers six or seven; and if the boats were covered we might travel by night or by day, and sleep, read, write, play at cards, drink tea, and partake of a thousand diversions.

All who see the work wonder how it could be effected, and those who consider the contrivance of the workman, are still more amazed at the œconomy with which it is carried on. Mr. Brindley, the principal engineer, is one of those great geniuses which nature sometimes rears by her own force, and brings to maturity without the necessity of cultivation. His whole plan is admirable, and so well concerted, that he is never at a loss; for if any difficulty arises, he removes it with a facility that appears so much like inspiration, you would think Minerva at his fingers ends. Besides the machines already mentioned, which are mostly new, as well as others I have passed over for want of room, he has contrived some caissons of admirable construction for raising the earth to preserve the level; and as these, as well as a smith's forge and carpenters and masons workshops, are floated on the canal, and follow the work from place to place, there is little hindrance from accidents; and as the duke has all the resources within himself, and timber, stone, mortar, and coal from his own estate, and at hand, he has been at little expence except for labour. It is also to be observed, that the duke, like a good chemist, has made the refuse of one work construct the material parts of another: thus the stone which was dug up to form a basin for the boats at the foot of the mountain, as well as that taken out of the rock to make the subterraneous passage, are hewn into different forms and dimensions, to build bridges over the water, or arches to support the aqueduct; and the clay and other earths taken up to preserve the level in one place, are carried down the canal to raise the land to a level in another.

Here grandeur, elegance, and œconomy are happily united. At first view you would think the work was intended to astonish; but upon a closer inspection



tion you find nothing but what is proper and necessary, and that the whole has been done at an expence no ways adequate to the undertaking. In short, the work is truly wonderful, and will be a standing monument of the good taste, public spirit, and œconomy of the duke of Bridgwater to the end of time.

I am, Madam, yours, &c.

M. N.

[Whilst the duke's navigation was in its infancy, and plans were forming to cut the Staffordshire canal, two gentlemen, who do honour to the pot-manufactory, published a pamphlet, intitled, "A View of the Advantages of Inland Navigations, &c." In which they thus mention their scheme :]

"The present design comprehends only a part of the great one mentioned above. It is to join the river Trent, near Wilden, in Derbyshire, with the river Weaver in Cheshire, or the duke of Bridgwater's navigation, or the tide-way in the river Mersey, as shall be found most expedient, by a canal, with branches to Birmingham, Litchfield, Tamworth, and Newcastle. And if this work meets with the approbation of the country, and the encouragement of the Legislature, in all probability the other parts of the design will soon be undertaken, to the great advantage both of the commercial and landed interests; and petitions to parliament, for branches out of the principal canals, will become as frequent as they now are for turnpike roads.

The canal now intended to be carried into execution, was first proved to be practicable by the survey of Messrs. Taylors of Manchester, and Mr.

Eyes of Liverpool, made in the year 1755, at the expence of the Liverpool corporation; and chiefly promoted by the late Mr. Hardman, an active and able friend to the commercial interests of this nation, and one of the representatives of that borough. And the public is indebted to the earl Gower, and the late lord Anson, for another survey of the intended course of this canal, made by Mr. Brindley in 1758, and afterwards reviewed by Mr. Smeaton, F. R. S. and Mr. Brindley jointly; and these surveyors concurred in opinion, that no tract of land in the kingdom was naturally better adapted for the purpose of an inland navigation, than none stood in more need of it, or was so convenient for an union of the east and west seas.

The reasons for preferring a canal to a river navigation, are many and important. The shortness of the voyage on the former, which is protracted on the latter by the winding course of the stream; the absence of currents, which in rivers impede the upward navigation more than they assist the downward\*, and hourly undermine and wear away the banks; the security from the mischief and delay occasioned by floods; the easier draught for the horses, as the boats will, in a canal, move nearer the towing path; and the advantage of choosing high ground for the locks; while in the other case, the situation of them must be regulated only by the accidental shallows of the rivers, are all circumstances greatly in favour of canals; and especially the last:

\* This advantage can hardly any where appear in a more full and striking light, than at Barton Bridge, in Lancashire; where one may, at the same time, see seven or eight stout fellows labouring like slaves to drag a boat slowly up the river Irwell; and one horse drawing a barge at a great rate upon the canal; which is carried over the river at this place, like a magnificent Roman aqueduct.



for as in river navigations, the locks must frequently be erected on low lands, the neighbouring meadows are thereby often rendered damp and swampy; while in canal navigations this disadvantage is not only avoided, but as the canal, to pursue its most convenient course, must frequently wind along the edges of the rising ground, numberless springs will be cut through, and the plain beneath rendered actually drier and more fertile. It is also another circumstance not unworthy of notice in favour of canals, when compared with river navigations, that as the conveyance upon the former is more speedy, and without interruptions, and delays, to which the latter are very liable, opportunities of pilfering earthen wares, and other small goods, and stealing and adulterating wine and spirituous liquors, are thereby in a great measure prevented. The losses, disappointments and discredit of the manufacturers, arising from this cause, are so great, that they frequently choose to send their goods by land at three times the expence of water carriage, and sometimes even refuse to supply their orders at all, rather than run the risque of forfeiting their credit, and submitting to the deductions that are made on this account.

We may also add, with respect to the potteries in Staffordshire, that this evil discourages merchants abroad from dealing in those manufactures, and creates innumerable misunderstandings between them and the manufacturers.

This canal is designed to fall into the Trent at Wilden rather than at Burton, to avoid the shallows which greatly interrupt the navigation on that river: At Harecastle, the highest part in the course of the canal, from whence the water falls north and south, it will pass above a mile under ground; by which means fewer locks will be necessary, and more water supplied from the coal mines in that country:  
and

and the whole length of it, with the branches, will be upwards of an hundred miles.

The canal and vessels are to be constructed on the plan found most eligible, from various experiments made on the duke of Bridgwater's navigation. From these experiments his excellent engineer, Mr. Brindley, hath proposed to compleat this canal as far north as Harecastle, purchase the land, erect locks, make towing paths, build bridges, and defray every expence, except that of obtaining the act of parliament, for seven hundred pounds a mile: to cut through Harecastle it is supposed will cost ten thousand pounds; and the remainder of the canal one thousand pounds a mile. He proposes to make the new canal twelve feet wide at the bottom; and three feet deep in general; but at the fords only thirty inches; and, in common, to supply it with a quantity of water just sufficient for the navigation, held up by locks, and having no stream, like those in Holland.

The boats are to be seventy feet in length, six feet wide, to draw near thirty inches water, and to carry twenty tons burthen. They are to be so constructed as to sail with either end foremost, by removing the rudder; and to cost about thirty pounds each.

There is to be a man and a boy to each boat, which one horse will draw with ease along the canal; but when necessary, will be able to draw three of them.

It is proposed to raise the money by subscription, in lots or shares, of two hundred pounds each; no person to subscribe more than twenty shares; the tonnage to be fixed by act of parliament, and vested in the subscribers, as a security for their money; the company to be under the inspection of commissioners, as in most other navigation acts; the shares to be



be transferable, in an easy manner, like government securities; the navigation to be free and open to all persons, paying the tonnage fixed by law; and land-owners to have liberty to erect warehouses and wharfs, on the banks or sides of the navigation.

It is also proposed to repay the money subscribed for obtaining the Act of Parliament, out of the capital stock, if the application to parliament be attended with success.

*Particular Advantages of the intended Canal.*

The advantages arising from cheapness of carriage and easy communication between the distant parts of a country, and the manufacturing towns and sea-ports reciprocally, are so very extensive and complicated, that it is impossible to reduce them to any very exact estimation. If we would attempt to estimate them at all, it will be necessary to discover, as near as we can, how much the price of carriage is likely to be diminished; and what quantities, and kinds of goods, will probably be conveyed by this navigation.

The price of land-carriage, in the neighbourhood of the canal, is, upon an average, about 9s. a ton, for ten miles. It is supposed the tonnage upon the canal, for the same distance, will be about 2s. and the freight not above 6d. more, making together 2s. 6d. per ton: so that near three fourths of the present price of carriage will be saved to the public. And the difference between land and water-carriage, in other places, confirms the justness of this conclusion. Land-carriage, for instance, between Manchester and Liverpool, which are about thirty-eight miles distant from each other, costs 40s. per ton; water-carriage only 6s. and 8d.

8*d.* one way, and 10*s.* the other; suppose 9*s.* upon an average; and the saving, by this navigation, is above three fourths of the expence of land-carriage.

If we suppose the saving to be only 6*s.* in 9, which is a very moderate computation, this circumstance alone will not only enable land-owners, manufacturers, and merchants, to convey many articles to markets where they never could have borne the expence of land-carriage; but will also bring into use many natural productions; such as coals, stone of various kinds, timber, iron ore, alabaster, &c. which, from their unfavourable situations, never could have been employed.

To give some idea of these advantages, we must endeavour to enumerate the chief sources of employment for the intended navigation: And these may be considered under the three following heads: 1. Natural productions of the countries that lie near the canal. 2. Cultivated commodities and manufactures. 3. Imported raw materials, and general commerce.

From Northwich to Lawton there lies a vast bed of rock-salt \*, about forty yards thick, which, besides being purified and chrystallized for home consumption and exportation, as will be mentioned in its proper place, might be made great use of in agriculture, and probably in metallurgy, and several of the mechanic arts, if any method could be discovered of granting the liberty of using it with safety to the revenue.

There is a mountain called Mole Cop, near Lawton, that contains four different and useful kinds of

\* These salt-mines were first discovered in the year 1670, by boring for coals, in the liberties of William Marbory, Esq; of Marbory, and lie about thirty-four yards from the surface.



stone. 1. Mill-stones of an excellent quality, which are now carried by land upwards of an hundred miles, and to all parts of the intended navigation. 2. A good lime-stone. 3. A fine free-stone. 4. Grinding-stones of different sorts \*.

Near Wolfeley-bridge, and also a mile below Burton, a free-stone is found on the banks of the river Trent, excellent for its firmness and colour, some parts of which seem not inferior to that of Portland or Roche-Abbey.

A mile from Rudgley, a blazing kind of coal, called canel, and other coals, are found, belonging to the Earl of Uxbridge. The lower stratum of these mines is said to be a valuable one; and it is apprehended a navigable fough might be carried from the new canal into the heart of them, in the manner of the duke of Bridgwater's colliery in  
Lanca-

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\* Between this place and Newcastle lies Burslem, the chief manufactory for white flint ware, which is as strong and sweet as India porcelain, and though 'tis rather slighted by the English ladies from its cheapness, foreigners give it its due preference, and use it generally at their tables; the exportation of it is annually to about the amount of 100,000 l. The chief potters have lately erected two turnpike roads, to make their wares more conveniently carried off. But this navigation will afford them opportunities, not only of shipping their wares for the several markets in Europe, but likewise their coals, which are equally good with those which the metropolis is generally supplied with, and lie under almost every field within two miles of the town of Burslem. These coals will then be a national use, and there is hardly any circumstance that contributes more to the flourishing state of a manufacturing country, than plenty and cheapness of fuel.

Lancashire; and that this would lay them dry; the want of which is the present obstacle to their being worked; and at the same time convey the coals into the new canal, to the great advantage of the noble proprietor, and the neighbouring country.

Near that part of the Trent where the canal is to terminate, arises a vast mountain of lime-stone, on which the village of Breden, in Leicestershire, is situated: at Tickenhall, in Derbyshire, not far from the last-mentioned place, there are also quarries of lime-stone; and at Barrow, in Leicestershire, they burn an excellent kind of lime for building, which is conveyed to places at a great distance, by land, every way; and lime is much wanted through the whole course of the canal, both for the purposes of architecture and cultivation.

A few miles lower, at Clay-Hill, a firm and elegant alabaster is found, proper either for stucco or sculpture.

Not many miles from the Trent, near the river Soar, in Leicestershire, (which it is hoped the gentlemen in that neighbourhood, and the inhabitants of Leicester, will now be able to make navigable, without opposition) are the noted quarries of Swithland slate; a beautiful and durable covering for houses; and prodigious rocks of that kind of grey porphyry, which is brought from Scotland, to pave the streets of London and Westminster.

A great quantity of marle will be thrown out in making the canal; and may besides, in many places, be found so near the banks, as to be delivered from the spade into the boats; which will greatly contribute to the improvement of such land as stands in need of this kind of manure. Other manures will also be procured from large towns, on reasonable terms, for back-carriage; and as it is intended



tended to exempt manure from the charge of tonnage, these advantages, together with the lime, mentioned before, will double the produce and value of many farms bordering upon the canal.

Several parts of the country, in the neighbourhood of the canal, yield great quantities of that sort of iron-ore, commonly called iron-stone, proper for making cold-short iron; and which, when mixed with the red-ore from Cumberland, makes the best kind of tough, or merchant-iron. The iron-stone of this country is likewise so necessary for working the ore in the north, that even the great expence of land-carriage hath not prevented large quantities of it from being conveyed that way to the river Weaver, to be shipped for Cumberland; and the ore from the north has been brought into this country under the like inconveniencies. It seems, therefore, highly probable, that the intended canal will occasion the sending much greater quantities of iron-stone into the north; and the receiving more red-mine back in return; and thereby greatly increase the intercourse between these two parts of the kingdom, to their mutual advantage.

Not only these natural productions, that are to be found on the banks of the intended canal, but many of those from the more distant parts of the counties it is to pass through, will have their value and consumption greatly increased, by this easy and cheap conveyance. Of this number are lead, copper, calamine, marble, rottenstone, raddle, white clay, ochres, &c. and many other articles will probably become useful to society, which at present lie unmolested in their native beds.

From natural productions we may proceed to the consideration of those that are cultivated and manufactured; and that which deserves our first attention, under this head, is corn; as the growth and

exportation of this important article will be greatly increased by a new navigation; and the benefit to the public, from the exportation of corn does not arise, as in other merchandise, only from the employment of our hands at home, the improvement of our estates, and the return of wealth, for which it is exchanged abroad; but likewise from its being an infallible security against those dreadful famines formerly experienced in this nation, in years of uncommon scarcity.

In the year 1751, an account of the exportation of grain was laid before the house of commons; and it appeared that above five millions of quarters of grain were exported from Great Britain in the years 1746, to 1750, both inclusive; and near seven millions and a half of money gained by the nation in exchange. And since grain has been made an object of foreign commerce, its price has not only in general been lowered at home, but its cultivation has increased to such a degree, that a good harvest is supposed to be a provision for four \* or five years.

The kingdom of England alone, according to Dr. Halley's computation, contains about forty millions of square acres; and of these, in the year 1689, when a bounty was first given on the exportation of corn, one third part was supposed to lie in uncultivated commons. No year has elapsed, since that time, in which the legislature have not passed many acts for the inclosure of waste grounds; whereby the country, in various places, is converted from barren heaths into fruitful fields; yielding

\* Sir John Nichols says five years; the corn-factors in London say, not much above two; but probably they do not make a sufficient allowance for exportation, and the distillery.



riches and support to the industrious farmer, and his useful dependants.

Agriculture is an inexhaustible source of plenty and riches, which can never be so much enlarged, or its streams so widely diffused, as by the means of inland navigations: And as the inhabitants, in some places near the intended canal, consume much more corn and grain of all kinds than they can raise, and those in others raise more than they can consume, this circumstance will find great employment for the navigation, to the general advantage of the adjacent counties.

The farmers, in the neighbourhood of the new canal, may indeed object, that the price of grain will never rise so high as it has done in times of scarcity, when there is the opportunity of an easy importation. In answer to which, it may be observed, that from the ease of exportation, it will never sink so low in plentiful seasons; so that the profits of the farmers, upon the whole, will not be less, but more equal: And we cannot help observing, in this place, that inequality of gain is, of all others, the most frequent cause of their ruin; as in scarce times, when their profits are great, they become more expensive and luxurious, and do not so well know how to contract their manner of life, when cheaper seasons lower the value of their commodities.

In times of plenty, the land-owners and farmers near the canal, will receive great benefit from the exportation of their grain, of all kinds: in times of scarcity, the whole country will be relieved, by means of a seasonable importation; and thus the blessings of providence be more equally and uniformly distributed, and an artificial dearth rendered almost impossible. How ineffectual would be the attempt of the most powerful monopolizer, in such a country as China, where plenty can be thrown into

any market, from all parts, by means of navigable canals ?

Another cultivated article, of great importance, is that of timber of all kinds, and especially oak ; of which there are many large woods near the course of the intended canal, that, for want of a proper conveyance to sea-port towns, where timber is much wanted for ship-building, are sold in the neighbourhood at a low price. Any method of conveying so bulky an article as this to the places of consumption, at an easy expence, will greatly encourage the growth of it, and help to repair that decrease \* of ship-timber in this nation, which is a very alarming circumstance, to a people whose riches and power depend so greatly upon navigation.

Cordwood, to make charcoal for the iron-works, oak-bark for the tanners, and woad, madder, and other articles which may become the objects of cultivation, will be carried at a cheap rate upon the canal, to the mutual advantage of the proprietors and consumers. Wool, hides, tallow, and provisions of various kinds, will become more beneficial to their owners, by the advantage of an easy conveyance, to places where they may be consumed or manufactured.

As this canal will go through the middle of Cheshire, so famous for the great quantities of good cheese it produces, the advantages arising from it to the dairies will be very considerable ; as many hundred tons of this article are annually carried by land, above forty miles, to Willington in Derbyshire, to be shipped for London, and other distant markets, which will, for the future, be sent by wa-

\* For a very interesting view of the proportionate decrease of oak timber, see Mr. Fisher's *Heart of Oak*, p. 72.



ter, all the way to Hull and Liverpool, at a very moderate expence.

From the Wiches, in Cheshire, manufactured salt is carried, on horseback, to almost all parts of Staffordshire, Derbyshire, Leicestershire, Nottinghamshire, Yorkshire, and Lincolnshire; to which places it will gain a much cheaper access, by means of the intended navigation: And so great is the home consumption of this article, that from the salt-works of Northwich only, a duty of 67,000*l.* was last year paid into the Exchequer. At Northwich and Winsford are annually made about 24,000 tons.

The town of Burslem, and villages of Stoke, Hanley-green, Lane-delf, and Lane-end, are employed in the manufacturing of various kinds of stone and earthen wares, which are carried, at a great expence, to all parts of the kingdom, and exported to our islands and colonies in America, and to almost every part of Europe; but the ware which is sent to Hull is now carried by land upwards of thirty miles, to Willington; and that for Liverpool twenty miles to Winsford. The burthen of so expensive a land-carriage to Winsford and Willington, and the uncertainty of the navigations from those places to Frodsham, in Cheshire, and Wilden, in Derbyshire, occasioned by the floods in winter, and the numerous shallows in summer, are more than these low-priced manufactures can bear; and without some such relief as this under consideration, must concur, with their new established competitors in France, and our American colonies, to bring these potteries to a speedy decay and ruin.

All the branches of the metallic trades, which are almost innumerable, and carried to an astonishing extent at Birmingham, Walsal, Wolverhampton,

ton, and other places in the neighbourhood of the intended navigation, must receive advantages from it, that cannot at present be estimated or conceived.

We have already mentioned the important circumstance of bringing ores out of the north, to mix with those in Staffordshire; by which the iron of that country must be rendered better and cheaper; and to this we may add, the great advantages of having charcoal, lime, and other fluxes brought to the furnaces at a small expence: And likewise the great saving there may be in conveying this heavy article from the forge to the manufacturer by water; all which circumstances must contribute to increase the consumption of English iron, and enable the iron masters, in that neighbourhood, to come upon a competition with foreigners, so far as to reduce the price of foreign iron, and upon the whole greatly to benefit both themselves and the manufacturers: and certainly the first object, in the encouragement of any manufactory, is to furnish it with its raw materials at the lowest price; to which nothing, in general, contributes so much as inland navigations.

By the means of this canal, then, the iron masters will be enabled to serve the manufacturers better with their materials; and by the same means, the manufacturers will be enabled to send their finished goods away much cheaper, and to more markets; by which the consumption, and exportation of them, cannot fail to be greatly increased.

The circumstance of a water-conveyance, all the way from Birmingham to the ports of Hull and Liverpool, will be a very great reciprocal advantage to all the three places. The reduction of the price of carriage, which will take place between Birmingham and the last-mentioned port, is so great



great a proportion of the value of guns, nails, and other heavy manufactures of iron, that the exportation of them from thence must be increased to a degree beyond estimation.

The fine ale made at Burton upon Trent, which is now exported to Germany, and several parts of the Baltic, may, by means of the intended canal, be exported from Liverpool to all parts of America, where it is likely to become a very considerable article of commerce.

The valuable manufactures of Nottingham, Leicester, and Derby, will find a cheap conveyance to Liverpool, by this navigation; and the demand for them, at that port, will consequently be increased.

In the neighbourhood of Burslem, and the potteries, bricks and tiles are made of a blue colour, which are so far vitrified, as to be harder, and more durable than any kind of stone used in building; and these articles are likely to find a demand through the whole course of the canal.

Having mentioned the principal natural productions, cultivated commodities, and manufactures in the neighbourhood of the intended navigation, we come to the articles of importation, and of general commerce.

Great quantities of flint stones, used at the potteries in Staffordshire, are brought by sea, from different parts of the coast, to Liverpool and Hull. And the clay, used in the white and coloured ware, is brought from Devonshire, chiefly to Liverpool; and from thence sent up the river Weaver to Winsford in Cheshire: The flints from Hull are sent up the Trent to Willington in Derbyshire; and from Winsford and Willington they are both brought to the works, at a very great expence, by land-carriage; the one being twenty, and the other not less than thirty-eight miles distant from the

potteries : and they are likewise subject to the same expences and delays, from floods and shallows, as the manufactured goods, mentioned before, to the very great disadvantage of the manufacturers. Inconveniencies, which nothing but a navigable canal can remove.

The iron-ore from Cumberland, as it will be a considerable article of importation, must be mentioned in this place, though, in another view, it has been taken notice of before.

Hemp, flax, and linen-yarn, will be conveyed by this canal, to various manufacturers, who make use of those materials ; and probably occasion the establishment of several new manufactories.

Deals for building, and mahogany for cabinet-work, which are much wanted, and are now very dear, in many parts of those counties through which the canal is to pass, owing to the heavy charge of land-carriage upon such bulky commodities, will be conveyed, through the whole extent of this navigation, at a moderate expence, and become very considerable articles of commerce.

American iron will also, by this means, be brought cheaper to the manufacturing towns, from the ports of Liverpool and Hull ; and contribute, with the advantages already mentioned, arising to the iron masters, to lessen the consumption of foreign European iron, to the great profit of this nation, in general, and our own iron works, in particular ; and have a tendency to keep that money at home, which, for want of a better system of commercial policy, is now sent to foreigners, who take very few of our manufactures ; and also to prevent the destruction of a trade, on which many thousands of industrious workmen depend for subsistence.

The numerous manufacturers in Birmingham,  
and



and its neighbourhood, will, in general, receive their raw materials, of all kinds, much cheaper, by means of the intended canal; such as copper, calamine, lead, zinc, ivory, and many others.

The merchants of Liverpool and Hull will supply the towns and villages, bordering upon the canal, with rum, wine, tobacco, sugar, and all kinds of groceries and dying-stuffs, at lower prices than they have been accustomed to receive these commodities, and with much more safety and expedition. And, as these are articles of general consumption, the amount of them must be very considerable; and the benefit to the public proportionably great.

The salt-trade will receive a very important advantage from the canal, when the navigation in the Weaver may, at any time, be interrupted; as that article may occasionally be forwarded to Liverpool by this new conveyance, for the dispatch of those vessels which would otherwise be detained there, at a great expence. And any injury the proprietors of the Weaver navigation have to apprehend from it, supposing the canal should not terminate in that river, must weigh light in the balance of public utility; as their freight depends chiefly upon salt, and salt-rock, from Winsford and Northwich; which, at present, amount to about 50,000 tons a year, and will no doubt be still increased: and none of this likely to come upon the new canal, but when floods, or the repairing of the locks, obstruct the Weaver; because the canal will be some miles distant from Winsford; and though it should come near the works at Northwich, the disadvantage of unloading, and loading again, as the canal-vessels cannot live in the tide-way, will prevent the salt from being sent by them, except upon such occasions as those that are mentioned above.

The diminution of the price of carriage, which will take place, by means of the canal, must also appear to be a very great and necessary advantage to our manufactures and commerce; when our present price of land-carriage is placed in a comparative view with that of our chief competitors: the price of land-carriage between Birmingham and London, being about 8*s.* per ton, for ten miles; and in the neighbourhood of the intended canal, and in many other places, no less than 9*s.* per ton; whilst merchandize may be conveyed, by land, between Lions and Marfeilles, in France, at the rate of 5*s.* per ton, for the same distance. A circumstance that must give the manufacturers of that nation a very great superiority over ours, at all markets, where they would otherwise meet upon equal terms.

Having considered the principal advantages which the public may reasonably expect from the execution of this design, we ought not to forget the pleasures that may arise from it to individuals; especially as taste is so universally cultivated, that our farms are gradually improving into gardens. And here it must be allowed, that to have a lawn terminated by water, with moving objects, passing and repassing upon it, is a finishing, of all others, the most desirable. And if we add the amusements of a gondola, that may convey us to many flourishing towns, through the most delightful vallies in the kingdom; and the convenience of having variety of fish, brought alive in well-boats, for our tables; we have articles of luxury, which the inhabitants, in other situations, wish for in vain.

So many, and important, are the advantages that will undoubtedly arise to the public from the intended canal, that we presume, an attentive consideration of them, must convince every one, that  
they



they infinitely outweigh all the inconveniencies that can be supposed to attend it: And it is to be hoped, every friend to his country will be cautious of giving weight to trivial inconveniencies, in opposition to a work of this immense importance; especially at a time when our manufacturers are suffering, for want of the usual demand for their goods; and when several rival nations, as well as our own colonies, are availing themselves of this opportunity, to seduce our workmen, in many branches, to leave the country, and contribute to the support of these alarming competitors.

Some of the objections, that may be urged against this navigation, have already been obviated; and those that remain, do not seem to be well-founded, or of great importance. It may be said, that many estates will be divided by the canal: but, as in several parts it will be carried through uncultivated commons, and lands that want draining: as a full compensation will be paid for the ground that is cut through; and as the farms will be again connected, by bridges and fords, at suitable distances; it is presumed no inconveniencies will proceed from this circumstance, which are not amply counterbalanced by the many advantages, that have been before pointed out, and must evidently arise to every farm through which it may pass.

Nor must we here omit the trite objection of the dishonesty of watermen, that they will pilfer fruit and poultry in their passage. But, certainly, this class of travellers may be ranked, in point of honesty, with the common carriers; and as one man and a boy will be sufficient to attend the conveyance of twenty tons of goods along the canal, which by land would require the attendance of ten persons, the number of these dangerous visitors will be greatly decreased.

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The only remaining objection that has occurred to us, is, that by an inland navigation, between the ports of Liverpool and Hull, the coasting trade, that great nursery for seamen, will be diminished. To which may be answered, that, in the first place, there is little or none of that trade between those two ports. Secondly, that as this inland navigation will give an opportunity for a more easy conveyance of the products of the interior parts of the country to the neighbouring ports, which may from thence be conveyed, by sea, to distant parts of the kingdom, from whence other products and commodities may be returned; the coasting trade must hereby be greatly promoted. And lastly, as this navigation will contribute to increase the produce of our farms, will benefit our present manufactures, and occasion the establishment of new ones, it must, of course, enlarge the amount of our exports; and, instead of lessening, have a direct tendency to augment the quantity of our shipping, and the number of our seamen.

It must also be observed, that when the other parts of this great design are executed, and the principal ports and manufacturing towns of the kingdom come to have a reciprocal inland communication by water, then, though the coasting trade may be diminished, the export trade will not only be inconceivably enlarged, but the internal national commerce be carried on with much more ease and dispatch; less exposed to expensive and hazardous delays; and perfectly secure, in time of war, from the depredations of an enemy.

How far these favourable circumstances must contribute to enhance the value of our lands; to promote the wealth, strength, and splendour of this nation; and to confirm, and perpetuate, the peculiar blessings and privileges of its inhabitants;



is referred to the imagination of every intelligent reader.—The prospect is delightful!—Patriot minds will dwell upon it with pleasure, and be employed in projecting schemes to realize it, in its whole extent.—But our present attention must be confined to one part of the general design: and, no doubt, many advantages to be expected from the navigable canal, now under consideration, will occur to the reader, that have escaped our notice: those that have been pointed out are, however, very numerous and extensive.

To have the means of conveyance so greatly facilitated; the price of carriage so much diminished; old manufactures encouraged; new ones established; estates greatly improved; plenty widely diffused; and the country, in general, rendered still more affluent, populous, and secure; are considerations of such weight, as cannot fail to interest all benevolent and public-spirited persons, in the success of this important undertaking.

The progress already made in this design, may be seen by the following papers.

AN ACCOUNT of the MEETING at WOLSELEY  
BRIDGE, in order to set on foot the  
STAFFORDSHIRE NAVIGATION.

At a meeting held at Wolseley Bridge in Staffordshire, on December 30, 1765, it was unanimously resolved to apply to parliament for leave to bring in a bill for making a navigable canal from Wilden, in the county of Derby, through Staffordshire, to the river Mersey. Earl Gower, lord lieutenant of the county of Stafford; lord Grey  
and

and Mr. Bagot, members for that county; Mr. Ashton Curzon, member for Clitheroe; Mr. Anson, member for the city of Litchfield; Mr. Gilbert, member for Newcastle-under-Line, and many others of the principal gentlemen and land-owners of that and the neighbouring counties, as well as several merchants and tradesmen from Liverpool, Birmingham, and other great trading towns, were present.

Lord Gower opened the meeting with a very sensible and elegant speech, in which he expressed his satisfaction in seeing so many gentlemen met together upon so great a design; that he looked upon it as of the utmost consequence to the manufactures of that and the adjacent counties, and to the kingdom in general; and that ever since he had heard of the scheme, it had been his determination to support it with all his interest, both provincial and political; for he was satisfied that the landed and trading interests were so far from being incompatible, that they were the mutual support of each other; and therefore his Lordship hoped, that every gentleman present would concur with him in endeavouring to carry so noble and so useful a design into execution. Mr. Brindley, engineer to the duke of Bridgwater, was then examined; and the heads of the plan were also produced, and agreed to, with very little alteration.

PROPOSALS for raising the Money for  
effecting the STAFFORDSHIRE  
NAVIGABLE CANAL.

At a very numerous meeting of land-owners,  
gentlemen, traders, and manufacturers, held at  
6  
Wolfeley



Wolfeley Bridge in Staffordshire, the 30th of December, 1765, it was unanimously agreed as follows :

That application be made to parliament this session, for an Act to make a navigable canal from the river Trent, at or near Wilden Ferry, in the county of Derby, to the river Mersey.

That it will be most convenient for the execution of this undertaking, if the expences of making and compleating the said navigation, which have been estimated at 101,000*l.* were to be distributed into 505 shares, and raised by subscription; and that no one person should have more than 20 shares; and the money to be advanced by each subscriber in equal proportions, as the same shall be wanted, and the shares made transferable by a form to be prescribed by the Act.

That a subscription be opened for a fund, to defray the necessary expences in obtaining the Act; and that the money there subscribed shall, after passing the Act, be repaid to such as shall not be subscribers, and allowed to such as shall be subscribers, in part of payment of their shares.

That a subscription be also opened for the money, which shall be wanted for making and compleating the said navigation, and that fourteen days time be allowed, after this day, to compleat the said subscription; and that subscriptions may be entered with Mr. Bentley, at Liverpoole; Mr. Tomkinson, at Manchester; Mr. James Ford, Town-clerk of Congleton; Mr. Sparrow, at Newcastle-under-Line; Mr. Stevenson, Mercer, at Stratford; Mr. Francis Cobb, at Litchfield; Mr. Boulton, at Birmingham; Mr. Willington, at Tamworth; Mr. Benjamin Mollineux, at Wolverhampton; Mr. Benjamin Cooper, at Walsal; Mr. John Finch, at Dudley; Mr. William Musgrave, at Burton upon  
Trent;

Trent; Mr. Samuel Crompton, at Derby; Mr. Abel Smith, at Nottingham; Mr. Samuel Twentymen, at Newark; Mr. Maddison, at Gainsborough; and Mr. Isaac Broadly, at Hull: Where books will be kept for that purpose; and an account is desired to be transmitted from each gentleman, of the subscriptions at each place, at the end of fourteen days, to the said Mr. Sparrow in Newcastle; and, if the subscription shall not then be compleat, fourteen days more to be allowed.

That if the shares to be subscribed, after this day, shall exceed the number which shall remain unsubscribed this day, they shall be reduced in due proportion.

That it will be convenient, in the execution of this undertaking, if the subscribers were to have votes, according to their number of shares, in the annual choice of a convenient number of directors, to be limited in the Act; who shall have the management and inspection of the work; and to have commissioners named in the Act, to determine all controversies and disputes which may arise.

That proper provisions should be inserted in the Act, for the making full satisfaction to the land-owners and their tenants, for all lands to be taken for the use of such navigation, and for all damages both present and future, which they may sustain thereby, and for the giving all proper conveniencies to such land-owners and their tenants, the same to be determined by commissioners, or juries where necessary, in the usual manner.

That it be proposed for the consideration of parliament, that a proper and reasonable tonnage be fixed by the Act, in proportion to the distance that each vessel shall pass upon the navigation; and also that the subscribers may be paid five per cent. for the respective sums advanced, from the time of their paying



paying in the same, till the whole communication shall be compleated ; and from that time that they may receive their proportion of the profits, according to their shares ; and that the subscribers be permitted to vote by proxy.

That no toll be taken for stone, gravel, or other materials for repairing the roads ; nor for dung, soil, or marle ; nor more than half tolls for lime, for the improvement of lands.

### EXTRACT OF A LETTER FROM BURSLEM.

*Sept. 8, 1767.*

Gentlemen come to view our eighth wonder of the world, the subterraneous navigation, which is cutting by the great Mr. Brindley, who handles rocks as easily as you would plumb-pies, and makes the four elements subservient to his will. He is as plain a looking man as one of the boors of the Peake, or one of his own carters ; but when he speaks, all ears listen, and every mind is filled with wonder, at the things he pronounces to be practicable. He has cut a mile through bogs, which he binds up, embanking them with stones which he gets out of other parts of the navigation, besides about a quarter of a mile into the hill Yelden ; on the side of which he has a pump, which is worked by water, and a stove, the fire of which sucks through a pipe the damp that would annoy the men, who are cutting towards the centre of the hill. The clay he cuts out serves for brick, to arch the subterraneous part, which we heartily wish to see finished to Wilden Ferry, when we shall be able to send coals and pots to London, and to different parts of the globe.

Yours, &c.

ANSWER TO DITTO, BY A  
CHESHIRE GENTLEMAN.

*Sept. 22, 1767.*

Your Burslem correspondent makes Mr. Brindley the Sir Isaac Newton of this age, but seems not to know, that the duke of Bridgwater has another ingenious man, viz. Thomas Morris, who has improved upon Mr. Brindley, and is now raising a valley to the level, by seven double water-locks, which enables him to carry earth and stone as if down steps. When each lock is opened, it admits a loaded vessel on one side, and lets out an empty one on the other; by which means tons of earth are carried, and the valley will soon rise to equal the hills around, and the navigation keep its level.

Near this place the duke has built warehouses for corn, and coal wharfs; he has cut through Dunham, carrying his navigation over the high road, and the river Bollen, and in three months will reach the town of Lymm. Upon the navigation in Dunham meadows the Earl of Stamford has built a bathing-house, which is to be the harbour for a pleasure-boat. Coals are now but about half the old price, and it is expected they will become cheap at Warrington, as soon as the navigation reaches that town.

AN ACCOUNT OF THE NAVIGATION  
FROM THE TRENT TO THE MERSEY.

*Sept. 24, 1767.*

The canal, which is twenty-eight feet broad, and four feet six inches deep in general, is finished for almost ten miles, and much more might have been done,



done, but the attention of the company has been chiefly employed in the most difficult parts of the work, and which must necessarily take up much time in completing. The principal of these is the great hill called Harecastle, through which a tunnel is making, of an oval form, in height twelve feet, and in breadth eight feet ten inches. For half a mile on each side this hill, the canal is of an extraordinary dimension, which will be a reservoir for the water which flows out of the hill both ways in great abundance.

About a mile and a half is finished in Cheshire, and nearly the same distance in Derbyshire; but the greatest part is from Armitage, through Hansacre, Bromley, Fradley, Alrewas, and to the river Trent. At Armitage the canal goes through an exceeding fine rock of free-stone, which is used in building locks, &c. The locks are seventy feet long; one is finished, and some others in great forwardness. Four road bridges are completed, and bricks and other materials provided for many more. The number of men usually employed is about six hundred. The company have come to a resolution to finish the two extremes, viz. from Shutborough to the Trent, and from Harecastle to the Mersey, first; as they will, when perfected, yield an immediate profit to the company. At the same time the works at Harecastle will be prosecuted with all expedition. A fire engine will be erected in the middle of the hill, and shafts sunk, at suitable distances, for drawing up the earth to the surface. Mr. Brindley has given the company an assurance that the whole of this navigation will be finished in five years.

# STATE OF THE NAVIGATION ACROSS THE TRENT, AND AT HARECASTLE.

*Oct. 1, 1768.*

At a general assembly of the company of proprietors of the Navigation from the Trent to the Mersey, held at Wolfeley Bridge, in the county of Stafford, on the 27th of Sept. last, it appeared, on the report of the committee, that twenty-two miles of this Navigation were finished, and a considerable distance more in great forwardness; that such part of it as was intended to open communications between the ports of Hull and Bristol, and the interior parts of the kingdom, would be completed within the space of eighteen months, and the whole of the Navigation in less than five years; that four hundred and nine yards of the subterraneous passage at Harecastle were cut and vaulted, besides the vast openings at each entrance, and the committee were not apprehensive of any difficulties in the execution of that or any other part of the work; that fourteen locks and twenty-six road-bridges were erected, and six boats built, five of which had been for some time in employment on the Navigation; that the canal was made navigable over the river Trent at Wichnor, without the assistance of a bridge or aqueduct. The general assembly approved the proceedings of the committee, and unanimously resolved, that the officers employed in this Navigation had properly discharged their duty in their departments.

PRO-



PROPOSAL TO MEET AT BANBURY  
IN ORDER TO EXTEND THE NAVIGATION  
TO THE THAMES AT OXFORD.

*Oct. 3, 1768.*

It was proposed to make a navigable canal to communicate with the navigable canal making from the city of Coventry to the great Staffordshire Navigation, and to pass through the several parishes, hamlets, or places, of Stoke, Binley, Comb, Brinklow, Long Lawford, Newbold, Brownsover, Clifton, Hillmorton, Barby, Willoughby, Braunston, Wolfthamcote, Lower Shuckburgh, Napton, Priors Marston, Priors Hardwick, Wormleighton, Fenny Compton, Burton Dassett, Warmington, Shotswell, Mollington, Horley, Nethorpe, and Banbury, and from thence through Adderbury, Deddington, North Aston, Middle Aston, Steeple Aston, Rousham, Shipton, Woodstock, Bladen, Begbrook, Yarnton, and Midvercot, to the city of Oxford, to communicate with the navigation of the river Thames; which places had been surveyed by Mr. Brindley, and the undertaking found to be practicable.

In order to know the sense of the country, of the several owners of land, (whose property will be much advanced by the establishment of this design) and of the manufacturers and traders, a meeting is desired to be held at the three Tuns in Banbury aforesaid, at eleven in the forenoon of the 25th day of October, 1768, in order to receive Mr. Brindley's report, and to take the proposal into full consideration: At which time and place the attendance and assistance of all persons concerned are desired, in

order to determine, whether to apply to Parliament in the ensuing sessions, for carrying into execution a design of such extensive utility to the public at large, as well as particular benefit to the counties of Warwick, Northampton, and Oxford: And, if the application be resolved upon, then, whether the undertaking should be vested in a company, subscribing according to certain rules, and taking the profits to themselves, agreeably to the plan of the Coventry, and other Navigation Acts, lately published.

By the Coventry Act, 50,000*l.* is the original sum to be raised. This sum is divided into five hundred shares of 100*l.* each. The shares are made personal estate, and transmittable as such. The money subscribed in shares is made payable by different calls or installments; and no call is to exceed ten per cent. at any one time, and between every call to that amount there must be an interval of three months. The facility of payment under this provision need not be enlarged upon. An interest of 5*l.* per cent. regularly paid, at a stated day in every year, attends the sums advanced upon every call; and, when the whole navigation is compleated, every Proprietor becomes entitled to a share of the full profits, answerable to the number of shares he may be possessed of.

#### SEQUEL OF THE ABOVE.

*Oxford, Oct. 19.*

At the very numerous and respectable meeting on Tuesday last, at Banbury, in this county, upon the great and important question of a navigable canal, projected by Mr. Brindley, from hence to Coventry, there was the most perfect unanimity in  
the



the determination of the company present, upon the utility of the design; and an uncommon alacrity in raising money to carry it into execution. The Dukes of Marlborough and Buccleugh, the Lords Spencer, Guildford, and North, the Vice Chancellor, and several of the Heads of Houses, the two Members for the University, with many other Gentlemen of great weight and consequence, as well as the Corporations of Oxford, Woodstock, Banbury, and Coventry, communicated (some of them in person, and the others by gentlemen deputed for that purpose) their most sanguine wishes for the success of the undertaking. Upwards of 50,000*l.* was instantly subscribed by the company present in its support. Mr. Walker, our Town-clerk, and Mr. Dadley, of Coventry, were ordered to prepare and solicit the Bill; and we hear the residue of the sum to be raised is already nearly engaged for.

#### SHORT ACCOUNT OF THE NAVIGABLE CANALS.

*Wolverhampton, Jan. 10, 1769.*

I herewith send you a short account of the Canal now making from the Trent to the Severn, which is the best I can possibly get at present, viz. there are twenty-one locks nearly finished, whose fall is about two hundred feet; thirty-six bridges of different sorts finished; twenty-three miles now cut; seven aqueducts finished, one of which is a large one to carry the canal over Stour; two subterraneous passages finished, one twenty-three yards, and the other sixty-eight, in length: the Birmingham and Stourbridge canals will join this. There are about five hundred men employed; above eleven

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miles

miles are already navigable, and it will certainly be compleated to join the Navigation from the Trent to the Mersey in two years. I cannot be so exact in my account of the Trent Navigation, but shall give you what I believe to be true: there are twenty-two miles cut, fourteen locks finished, twenty-six road-bridges finished, and six boats navigating; about four hundred and fifty yards of the subterraneous passage under Harecastle-hill finished. It will be finished in less than five years, five hundred men being employed. There is no machine made use of to raise and lower vessels otherwise than by locks.

The promising state of the Cheshire and Staffordshire Navigations, have encouraged the Warwickshire gentlemen to set on foot another branch of Navigation, which is now cutting, and will extend from the Staffordshire canal to the city of Coventry, from whence it hath been proposed to carry on the same, by Warwick, to Stratford upon Avon. It is likewise determined to cut a canal from Coventry to Banbury, and from thence to join the Thames at Oxford, by which means timber, pots, lead, lime, corn, cheese, manufactured iron, brick, coals, and other articles of merchandize will cheaply be conveyed to London. Another part is now cutting near Birmingham, and will communicate with the Severn: and, to make the inland navigation of England more extensive and useful, a design is formed of making a navigable canal from Leeds to Liverpool, where it will join the Mersey; by which the manufactures of the different counties may be exchanged, and the merchandize of Great Britain be cheaply conveyed to its sea-ports, and all over Europe.

I cannot



I cannot leave this subject without mentioning  
 \* Mr. Brindley once more, who, great in himself, harbours no contracted notions, no jealousy of rivals; he conceals not his methods of proceeding, nor asks patents to secure the sole use of the machines which he invents and exposes to public view: Sensible that he must one day cease to be, he selects men of genius, teaches them the power of mechanics, and employs them in carrying on the various undertakings in which he is engaged.

'Tis not to the duke only that his services are confined, he is of public utility, and employs his talents in rectifying the mistakes of despairing workmen, and in setting on foot large and useful machines, in the silk-throwing, mill-working, mine-draining, and various other ways, by which he opens new veins of treasure to Great Britain. His powers shine the most in the midst of difficulties. When rivers and mountains seem to thwart his designs, then appears his vast capacity, by which he makes them subservient to his will; but I will not further attempt to describe his talents, which deserve the pen of a Plutarch, and the skill even of a Brindley.

#### OBSERVATIONS ON THE COVENTRY CANAL,

S I R,

*Feb. 16, 1769.*

There is an inexhaustible bed of coals in Warwickshire, which, by means of navigable canals, might be brought into circulation, make firing cheaper all over the kingdom, and enable our present collieries to serve foreign markets, without

• Written in the life-time of Mr. Brindley.

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distressing

distressing the poor tradesman and manufacturer in the metropolis and other places. For want of such a canal, the collieries in Warwickshire cannot be worked; because a land-carriage cannot be obtained, at any rate, to bring them to market. Ought this mine of riches to lie buried in the earth, because private interest clashes with public emolument, or fanciful chimeras perplex the brains of some shallow-headed servants of the public? Is it not demonstrable, that the present high prices of all provisions will be reduced by the increased quantity of coals brought to market? I will not stay for an answer; I say it is demonstrable.

I moreover assert, that an increase of land-carriage (which must be increased, or else coals from Warwickshire, Oxford, Northampton, or Bedford, cannot be had to supply the demands of the Petitioners for the Bill) will raise the price of all provisions whatever. People affect to talk about the nursery for seamen; but let them consider whether the arguments drawn from that topic are not only in themselves weak and inconclusive, but really founded upon principles which stand in direct opposition to truth? Whether the high prices of provisions, and particularly of fuel, do not tend to depopulation? And whether the number of hands, now employed in wood-stealing, hedge-breaking, &c. might not be applied to better purposes? Take this maxim into your account, If the King wants Subjects, he must want Seamen. Shall I go further and say, whoever opposes inland navigation, virtually opposes plenty and population?

I am, &c.

*Feb. 23, 1769.*

The arguments without doors against the Coventry canal are chiefly these; That it may affect the



the coasting trade, and so lessen the number of seamen; that it may lower the price of Newcastle coals; that it will consume a great quantity of land, and must injure the proprietors over whose estates it shall pass; and that the tonnage will not pay the subscribers one per cent. for their money. As the last objection doth so manifestly contradict the two first, perhaps the advocates for the bill will admit it in its utmost force. Who then can enough applaud the public spirit of these subscribers, who, at such great disadvantage, are willing to undertake a work for the sake of supplying their poor neighbours with one of the most important necessities of life? But I hope better: I hope, Sir, the navigable canal will prove beneficial even to the undertakers, and will reduce the exorbitant price, not of Newcastle coals, (for that indeed I do not see much likelihood of,) but of fuel in general, all over the kingdom. The Newcastle coals, for their superior quality and fitness for particular trades, will always be in demand; and, indeed, upon repeated experiments, it hath been proved, that 75 pounds of good Newcastle coals, will go as far, even in culinary business, as 112 of the best Wedgeberry. However, the Wedgeberry coals, and those from the Coventry pits, will answer almost all purposes (excepting where charcoal is required) better than any sort of wood; and the destruction of wood for fuel is, perhaps, one of the most capital evils which this canal is sure to remedy. Our ancestors made wise laws for the encouragement of the growth of timber; but we now find so good a market for fuel, that we pay little regard to those laws, cutting down samplers and young sprigs, even for faggot wood, and planting none but such as will soon turn to fuel. So beneficial will the canal be in this particular, that the poor people, who now  
destroy

destroy all our hedges in the country through which it is intended to pass, will find hedge-breaking a losing trade, as it is beyond a doubt, that coals at 12 *d.* or 13 *d.* a cwt. will be cheaper to them than hedge-wood stolen. As to the coasting trade, I should apprehend the gentlemen who make that objection, little consider the great disadvantage which will lie upon the new navigation, as opposed to that by sea. Cheshire cheeste, of which much talk hath been made, will now go to London by sea under the rate of a guinea per ton, and that is less by 2 *s.* or 3 *s.* than it will cost if it were carried to Oxford for nothing, and thence sent to London by water. The Liverpool trade hath also been mentioned. Merchandize by sea may be sent from thence at less than 20 *s.* per ton; whereas, if it be sent to Oxford first, and afterwards to London, it will, I suppose, nearly treble that sum. But were it otherwise, are not the public advantages, which are sure to arise from this scheme, sufficient to counter-balance the inconvenience of some very few hands being taken from the coasting trade? We will suppose that the place of some few thousands of chaldrons of coals (not ten) may be supplied by means of this canal; will the lessening fifty, or threescore, or even fourscore hands in the coasting trade, fill us with such terrors, as to crush a scheme that may preserve thousands from perishing? As to the loss of land, so far as it affects proprietors, it is intended, I presume, to be paid for. As it affects the public, let us only consider what an immense quantity of horse provender is consumed for the support of that land carriage which this canal is intended to reduce; and what a multitude of acres will be brought into cultivation for wheat and barley, which are now wasted for horses; let us also consider the immense sums of money



money paid by the public, for the liberty of travelling in the very worst turnpike roads in the kingdom, and which can never be made good so long as the great number of heavy carriages are obliged to pass over them; and then, I believe, we may very soon reconcile ourselves to the loss of land, which in the mouth of a florid orator may cause dreadful impressions. As to the damage feared by the proprietors over whose lands the canal may happen to pass, I shall hope, from the justice of parliament, compensation will be made for it. But let private gentlemen consider, nay, Sir, let the public consider, that by a more equal distribution of the people, (the most certain consequence of inland navigation,) the more easy superinduction of manure upon the lands in the vicinage of the canal, the reduction of the price of coals, and thereby of all kinds of labour, those lands will not only be raised greatly in their price, but, what is much more to the purpose, greatly in their value. The manufacturers and product of the kingdom, the only real riches we have, will be increased, our poor will be relieved, and our roads once more become passable.

I am yours, &c.

P. S. On the behalf of my countrymen, I beg leave to acquaint your readers, that the price I have paid for Newcastle coals, for my own use, is 69s. per chaldron, short measure; and for Wedgeberry coals, the enormous price of 2s. 8d. for 112 lb. weight; and that in the present state of the roads they are not to be procured even at that price.

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*Feb. 25, 1769.*

I beg to ask the opposers of the navigation from Coventry to Oxford, whether they think all the inconveniencies they have pointed out, are equal to the

the starving to death many hundreds of poor inhabitants in the inland counties, where coals may be brought by such a navigation? For I do take upon me to say, that were the overseers of the poor ever so much disposed to shew compassion to the poor, they have it not now in their power to procure them fuel: There are many places near Banbury, Brackley, Bicester, &c. where coals cannot possibly be had at any price to supply the necessary demand for them, where the strong and able poor have long subsisted by hedge-breaking; the wood is almost gone for fuel, which should grow for timber; there are no turbaries, and, in short, there are no materials by which the poor can procure even a wretched fire. In these parts, I believe, they often perish by cold, though their cases do not appear in print: They are now dying (I may say like rotten sheep) of putrid diseases, probably occasioned by their cold, damp, comfortless dwellings. Ask physicians if this be an unreasonable suggestion! And they must not have fire, forsooth, to keep them alive, for fear Cheshire cheese should go to London by way of Oxford, or coals should be raised 1*d.* a hundred in Warwickshire! As to all the objections touching the coasting trade, they are absurd, groundless, and calculated to serve private purposes, or borough purposes.

I am, &c.

#### A SUMMARY VIEW OF THE CANAL, FROM LEEDS TO LIVERPOOL.

A navigation betwixt the East and West Seas by the rivers Air and Ribble, was, many years ago, deemed a practicable and desirable work, by several gentlemen of speculation and public spirit; and



some endeavours were used by them, at several periods (though without effect) to draw the public attention towards it: While this design was in contemplation, his grace the duke of Bridgwater formed his plan of a navigable canal from Worley-Mill to Manchester, which he soon after executed with amazing ability and success. Works of genius naturally draw the attention of men of genius. Mr. Longbotham, therefore, having viewed and examined this canal, and the manner of carrying it into execution, and warmed with a just spirit of emulation, conceived the noble design of making a canal of the like sort from Leeds to Liverpool; and, to be thoroughly satisfied whether it was practicable or not, he took an actual survey of all the intermediate country between these two extremities. That plan, with an estimate of the expence of executing it, he produced at several public meetings, called at sundry times and places, in the counties of York and Lancaster. At several of these meetings, composed of the gentlemen and owners of lands lying near the intended canal, *It was unanimously resolved*, That the scheme was practicable, and if executed, would be of great service to the country; and to put the question beyond a doubt, whether it was practicable or not, it was farther agreed to call Mr. Brindley to the re-survey of it, a gentleman whose surprizing success in executing works of this kind, has justly intitled him to the highest credit.

Mr. Brindley, after surveying by himself, and his agent, the whole line as laid down by Mr. Longbotham, reported to two numerous meetings of gentlemen, merchants, &c. held at Bradford the 5th, and at Liverpool the 9th of December, 1768, that it was very practicable, and might be executed at an expence which he produced, in a particular detail

detail of all the works, and estimates of them; which being too long to insert here, the following is the summary of it, viz.

Mr. Brindley estimates the full expence of making the proposed canal from Leeds to Liverpool, being one hundred and eight miles and three quarters long, upon a plan of forty-two feet wide, at the top, and five feet deep, at	—	259,777
The interest of which, at 5 per cent. per annum, will amount to near	—	13,000
The expences of keeping it in repair, the salaries of officers, losses, and other accidents, at	—	4,000
Making together, per annum	—	17,000

*And that the tonnage will at least make as follows, viz.*

Lime-stone, lime, slate, flags, brick, and free-stone, at a halfpenny per ton per mile	—	8,500
Coals, at one penny per ton per mile	—	3,500
Lead, iron, deals, timber, hemp, flax, Hambro' yarn, wool, woollen, linen, and cutlery goods of all kinds, groceries, dying-wares, mahogany, salt, Burslem wares, wine, spirituous liquors, corn, butter, cheese, Irish yarn, allum, &c. &c. will amount to, at one penny halfpenny per ton per mile	—	8,000
Making together	—	20,000

These being the calculations upon which this undertaking is founded, it is now to be considered, whether the advantages which may probably arise from this canal, will equal the expence of making it.

The advantages which may probably arise from this canal, may be reduced to these two heads.

1. As



1. As accruing to the particular country through which the canal passes.

2. As accruing to the whole kingdom in general.

And first, the advantages which will accrue to the particular country, are,

1. It will make the mutual exchange of the native productions and commodities of one part for those of another part, easy, expeditious, and cheap.

2. It will greatly advance the trades and manufactures carried on in that country.

3. It will improve the lands, and increase the population of that country.

4. It will save an enormous expence of land-carriage.

Whoever takes even a superficial view of the intermediate country between Leeds and Liverpool, will find some parts abounding with the best of coal, but destitute of lime-stone; while, in other parts, he will find inexhaustible rocks of the best lime-stone, but a total want of coal. In other parts he will find fine slate, flags, and free-stone, lying neglected, and of no value, through the prodigious expence of land-carriage, altho' much wanted upon the line. In some parts there is great plenty of timber fit for ship-building, and of wood fit for common buildings, and making tools and utensils in husbandry, as well as for charcoal and other uses in trade; while, in other parts, scarce a single tree, (unless planted for ornament,) is to be seen for many miles together.

In a great part of Craven and Lancashire, the whole country, for many miles together, consists almost solely of pasture, and a small portion of meadow, and is employed in raising and feeding cattle only; insomuch that the landlords generally restrain their tenants from using the plough; their  
corn

corn for bread, and every other use, they are forced to get, at a very great expence, by land-carriage.

From this cursory, short, and imperfect view of the country, it at first sight appears how general and extensive advantages will accrue to the whole adjoining country from this canal, which will, as it were, connect the whole, and make every part partake, at an easy expence, of the natural and acquired advantages and conveniencies of the rest.

The coals will be carried to, and burn the lime-stone throughout Craven; and the lime-stone will also be carried from thence, and purchase the coal at the coal-works adjoining to the canal.

The slate, flags, and free-stone, that now lie buried and useleis, will be brought to light, and not only supply those parts of the country where they are wanted, but also be carried coastwise upon both the West and East Seas, (even as far as London,) as they now are from the neighbourhood of Leeds and Halifax, by water-carriage.

The timber for ship-building, and wood for building of houses, and for the uses of husbandry, and in several branches of manufactures, produced by those parts where it abounds, would easily and plentifully supply the wants of those parts, where at present it is scarce and dear. And Craven, and the adjacent parts, where little or almost no corn is grown, but where very great quantities are, and of necessity must be consumed, will be eased of the excessive burthen of land-carriage, and will be constantly, plentifully, and easily supplied with that absolutely necessary commodity, by this water-carriage, from the market at Leeds on the one hand, and from what is called the File-Country in Lancashire, on the other.

These are part, and but a small part, of the very great and almost inconceivable benefits, which will  
arise



arise to the whole intermediate country, by the mutual exchanges of the native productions and commodities of one part for those of another.

2. It will contribute very much to the advancement of trade and manufactures.

All experience tells us, that nothing contributes more to the encouragement of trade and manufactures, than ease in the conducting them, facility in procuring the proper materials for them, and in carrying the manufactures, when made, to a proper market, and a certain and uniform subsistence for the manufacturers.

Now all these encouragements this canal will give. A constant, ready, cheap, and certain conveyance of every species of goods, from one place to another, will render the management of trade easy, and will also supply the manufacturers with great variety of materials, as Irish wool and yarn, cotton, indigo, dying-woods, and other materials; and at the same time, will provide a constant and uniform plenty of subsistence, as the market will be, as it were, brought to their own door; corn, potatoes, garden-stuff, and other sorts of provisions, will be continually passing and repassing along the canal, as markets fluctuate; and the scarcity of one place will be supplied by the superfluity of another.

3. It will greatly improve the lands, and increase the population of the country.

Lime, when used with judgment, is, beyond doubt, one of the best manures for land, and by the help of this canal, may be had in great plenty, and cheap, from one end of the canal to the other, and for six miles or more on each side of it, to the great improvement of this large and extensive tract of ground, in several parts whereof, at present, little lime can be had, and in many other parts it

H

is

is so excessive dear by the land-carriage, that it is but rarely and sparingly used. Besides this, marl, and other manures, particularly foul salt, might also be had by means of this canal, in many considerable parts of this intermediate country, which now can get no such thing. And that the population will be increased, is evident from what is said before; for where manufactures are encouraged, where there is plenty of work and plenty of wholesome provisions, population never fails.

4. It will save an immense expence in land-carriage.

This will appear evident, if the present price of land-carriage be compared with the price proposed to be taken for the water-carriage. The price of land-carriage, at present, is on an average one shilling per mile per ton; the price proposed to be taken by water, for tonnage, freight, and all incident expences, is, for merchandize, two-pence per ton per mile, or one-sixth part of the land-carriage; for coals a penny halfpenny per ton per mile, or one-eighth part of the land-carriage; and for limestone, lime, slate, &c. one penny per ton per mile, or one-twelfth part of the land-carriage. Thus, upon a medium, at least seven parts in eight of the expences of land-carriage will be saved to the public.

To how much this saving may amount, it is not easy to say with certainty; but if the profits to arise from the navigation, as mentioned above, be truly calculated, and by those who know the country best, it is deemed to be rather below than above the truth; this saving will amount to about 200,000 *l.* a year.

Besides these advantages, there is still another arising from time, or from the certainty and expedition of this mode of conveying goods and merchandize



chandize from one place to another ; an advantage well understood by all traders and manufacturers. Now, a proper number of decked boats, (suppose six,) built after the manner of those now made use of by the duke of Bridgwater, divided into three or four convenient rooms for passengers and merchandize, of which one should set out from Leeds, and another from Liverpool, every morning, at a certain stated hour, and making certain short stays in their passage, at certain stated times and places, to take in and discharge goods and passengers, would furnish to these great towns, and the whole intermediate country, a certain, safe, cheap, and commodious conveyance of goods and passengers, from place to place, and complete the whole passage from Leeds to Liverpool, and in like manner from Liverpool to Leeds, in three days.

But advantages no less great, and by far more extensive, will arise to the trade and manufactures of this kingdom, by the opening this short, expeditious, and safe communication between the East and West Seas. The whole intermediate country between Leeds and Liverpool, and for a considerable extent on each side the canal, will be supplied with wool, woollen-yarn, corn, and provisions, hides, tallow, &c. from Ireland, the produce of America, and whatever else is imported at Liverpool ; and the same country will also be supplied with linen, linen-yarn, tin-plates, deal, timber, board, planks, iron, hemp, flax, Russia linen, tallow, pot-ash, and whatever else is imported from the East countries, at the port of Hull, and be an equal encouragement to, and advantage in all our exports. And though this may seem to affect this country in particular, by advancing its manufactures, and improving its lands, yet the whole kingdom shares in the improvement and advancement

of its manufactures, which annually bring into it not less than two millions sterling: besides, the advantage of this internal navigation from East to West, without being obliged to go round the island, will, in time of war, be a prodigious advantage to the whole trading interest. Upon the whole, the many advantages arising from this navigation, from sea to sea, are so many, and so various, and of such prodigious value to the kingdom in general, as well as these countries in particular, that it is difficult, if possible, to form a full idea of them.

Having taken a short view of some of the advantages which are likely to arise from this undertaking, it seems necessary to consider two objections that are made to it.

1. That it will injure, if not take away, the properties of those persons through whose lands it is to be cut.

2. That the profits which this navigation will produce, will not equal the interest of the money that must be expended in making it.

As to the first of these objections, It is intended that the proprietors shall be, by Act of Parliament, particularly restrained as to houses, gardens, yards, parks, paddocks, planted walks or avenues, or lawns inclosed, and adjoining to any house; and as to all other lands, a full and ample consideration must be paid for them, before the proprietors can cut into them; which consideration, if the landowners and proprietors cannot agree upon it, must be settled and determined by a jury of the neighbours, assisted and directed by a number of commissioners appointed out of the best gentlemen in the country, not being proprietors of, or interested in the navigation.

As to the second objection, the above-written calculation, made by the most skilful and experienced men that could be had, will sufficiently answer it.



And in order to make the expence, and raising the money, as easy as possible, it is agreed to petition the legislature, to have the powers vested in a company, and to divide the capital into two thousand and six hundred shares, of 100*l.* each; to bear an interest of five per cent. regularly paid on a stated day in every year, till the work is completed, when the full profits will be equally divided annually, in proportion to the shares each person is possessed of; and that each subscriber shall have a vote upon all occasions, by himself, or proxy, for every share; and that no person be allowed more than one hundred shares, which will be a security against all partial and injurious influence in the execution of the works, or management of the company's affairs when completed.

And as the work is calculated to be finished in eight years, and the money subscribed will be called for only as it is expended, and an interval of three months between every call; the payments will rarely exceed five or six per cent. at one time, as is the practice in the Staffordshire canal; which may encourage many well-wishers to this undertaking, to be subscribers, who might otherwise think it inconvenient.

Upon the whole—If we consider that Holland, the most populous and opulent country in the world, (of its dimensions,) owes much of its prosperity to its numerous canals, and would soon fall almost into desolation, if deprived of them; that upon the clearest evidence, many important advantages must arise to England in general, where coal, lead, tin, potters clay, rock salt, iron ore, limestone, and many articles of commerce, are conveyed by inland navigations to our manufacturing towns, in so cheap a manner, as to enable the English to undersell the French, and to shew cloth of every denomination, such as does com-

mand trade at all foreign markets. These peculiar advantages every Englishman should keep in view; and whether employed as a manufacturer or as a tradesman, go on with unremitting industry, the sure means of keeping this country the richest and most powerful in the world.

### EXTRACT OF A LETTER FROM MANCHESTER.

*June 25, 1779.*

The public reap great advantage from the lime-kilns built near the Bridgwater navigation; nor can I pass silently over the capital and new-erected salt-works, built upon the banks of the navigable canal at Thurlwood in Cheshire, the property of Messrs. Salmon and Penlington. In an adjoining valley they have fixed a fire-engine, constructed by Messrs. Watt and Boulton, which, in the waste of three hundred weight of coals, (value nine-pence) does in twelve hours throw up to the height of a hundred yards, not less than twenty-four thousand gallons of brine; which is received in a very large reservoir, and from thence conveyed to the salt-pans, where the salt is extracted, and loaded into barges, in which it is carried into Staffordshire, Derbyshire, and the neighbouring counties. On another part of the Staffordshire canal, Messrs. Wedgwood and Bentley have established a most capital manufactory of earthen ware, called it Etruria, and have built a village near to it, which is occupied by the manufacturers. The place heretofore Long-bridge, is now called Long-port, where the potters of the country embark their wares designed for London, and many parts of the globe. Indeed this may be said of the inland navigations—new houses have been erected, new employments have arose near them, and already they have proved of national advantage.



TABLES OF DISTANCES,  
RATES OF FREIGHT, &c.

Upon the Navigation from the Trent to the Mersey,  
The Staffordshire and Worcestershire, and Birmingham  
Canals.

Goods from and to the under-mentioned Places, are  
landed at the following Wharfs.

References to  
the Tables.

- N<sup>o</sup> 1 | Ashbourne, Derby, Kegworth, Loughborough,  
Leicester, and the adjacent places. Goods are here  
re-shipped from and to Nottingham, Newark,  
Gainsbro', and other parts of the river Trent;  
Hull, Yorkshire, and the Eastern Coast.
- 4 | Burton, Ashby, Uttoxeter, &c.
- 6 | Atherstone, &c.
- 7 | Lichfield, Tamworth, &c.
- 8 | Rudgley, Abbots-Bromley, &c.
- 13 | Stone, Eccleshall, &c.
- 15 | Newcastle, Cheadle, Leek, &c.
- 17 | Congleton, Macclesfield, &c.
- 21 | Sandbach, Nantwich, &c.
- 24 | Northwich, Knutsford, &c.
- 27 | Frodsham, Chester, &c. Goods are also here re-  
shipped from and to Liverpool, Lancaster,  
Kendal, Preston, and other parts of the North.
- 29 | Stafford, Drayton, Cannock, &c.
- 31 | Brewood, Newport, Wellington, &c.
- 37 | Stourbridge, &c.
- 39 | Stourport. Goods are here re-shipped from and  
to Bewdley, Bridgenorth, Shrewsbury, Wor-  
cester, Gloucester, Bristol, other places upon  
the Severn, &c.
- 40 | Wolverhampton, Walsall, Bilstone, Shifnall, Dud-  
ley, &c.
- 46 | Birmingham, Oxford, Coventry, Colehill, War-  
wick, Bromsgrove, &c. Goods are here re-load-  
ed from or to London, Manchester, Chester,  
Liverpool, Warrington, &c.





## NAVIGATION FROM THE TRENT TO THE MERSEY.

N<sup>o</sup> of  
Wharfs, &c.

1	Shardlow, the Junction with the River Trent.																											
2	Miles. $6\frac{1}{2}$   Cuttle Bridge.																											
3	12	$5\frac{2}{3}$	Willington.																									
4	16	$9\frac{2}{3}$	4	Horninglow.																								
5	21	$14\frac{2}{3}$	9	5	Barton Turning.																							
6	$22\frac{1}{2}$	$16\frac{1}{6}$	$10\frac{1}{2}$	$6\frac{1}{2}$	$1\frac{1}{2}$	Wichnor.																						
7	28	$21\frac{2}{3}$	16	12	7	$5\frac{1}{2}$	Bromley Wharf, near Lichfield.																					
8	$33\frac{1}{2}$	$27\frac{1}{6}$	$21\frac{1}{2}$	$17\frac{1}{2}$	$12\frac{1}{2}$	11	$5\frac{1}{2}$	Rudgley.																				
9	$34\frac{1}{2}$	$28\frac{1}{6}$	$22\frac{1}{2}$	$18\frac{1}{2}$	$13\frac{1}{2}$	12	$6\frac{1}{2}$	1	Aqueduct at Brindley's Bank.																			
10	$38\frac{2}{3}$	$32\frac{1}{3}$	$26\frac{2}{3}$	$22\frac{2}{3}$	$17\frac{2}{3}$	$16\frac{1}{6}$	$10\frac{2}{3}$	$5\frac{1}{6}$	$4\frac{1}{6}$	Haywood, the Junction with the Staffordshire and Worcestershire Canal.																		
11	$40\frac{2}{3}$	$34\frac{1}{3}$	$28\frac{2}{3}$	$24\frac{2}{3}$	$19\frac{2}{3}$	$18\frac{1}{6}$	$12\frac{2}{3}$	$7\frac{1}{6}$	$6\frac{1}{6}$	2	Shirleywich.																	
12	43	$36\frac{2}{3}$	31	27	22	$20\frac{1}{2}$	15	$9\frac{1}{2}$	$8\frac{1}{2}$	$4\frac{1}{3}$	$2\frac{1}{3}$	Sandon, Stone Quarry.																
13	$48\frac{1}{3}$	42	$36\frac{1}{3}$	$32\frac{1}{3}$	$27\frac{1}{3}$	$25\frac{5}{6}$	$20\frac{1}{3}$	$14\frac{5}{6}$	$13\frac{5}{6}$	$9\frac{2}{3}$	$7\frac{2}{3}$	$5\frac{1}{3}$	Stone.															
14	$53\frac{2}{3}$	$47\frac{1}{3}$	$41\frac{2}{3}$	$37\frac{2}{3}$	$32\frac{2}{3}$	$31\frac{1}{6}$	$25\frac{2}{3}$	$20\frac{1}{6}$	$19\frac{1}{6}$	15	13	$10\frac{2}{3}$	$5\frac{1}{3}$	Hemheath, near Trentham.														
15	56	$49\frac{2}{3}$	44	40	35	$33\frac{1}{2}$	28	$22\frac{1}{2}$	$21\frac{1}{2}$	$17\frac{1}{2}$	$15\frac{1}{2}$	13	$7\frac{2}{3}$	$2\frac{2}{3}$	Stoke.													
16	58	$51\frac{1}{3}$	46	42	37	$35\frac{1}{2}$	30	$24\frac{1}{2}$	$23\frac{1}{2}$	$19\frac{1}{2}$	$17\frac{1}{2}$	15	$9\frac{2}{3}$	$4\frac{1}{3}$	2	Etruria, the Junction with the Caldon Canal.												
17	60	$53\frac{2}{3}$	48	44	39	$37\frac{1}{2}$	32	$26\frac{1}{2}$	$25\frac{1}{2}$	$21\frac{1}{2}$	$19\frac{1}{2}$	17	$11\frac{2}{3}$	$6\frac{1}{3}$	4	2	Burslem.											
18	63	$56\frac{2}{3}$	51	47	42	$40\frac{1}{2}$	35	$29\frac{1}{2}$	$28\frac{1}{2}$	$24\frac{1}{2}$	$22\frac{1}{2}$	20	$14\frac{2}{3}$	$9\frac{1}{3}$	7	5	3	North end of Harecastle Tunnel.										
19	64	$57\frac{2}{3}$	52	48	43	$41\frac{1}{2}$	36	$30\frac{1}{2}$	$29\frac{1}{2}$	$25\frac{1}{2}$	$23\frac{1}{2}$	21	$15\frac{2}{3}$	$10\frac{1}{3}$	8	6	4	1	Red Bull, near Lawton, Cheshire.									
20	$66\frac{1}{3}$	60	$54\frac{1}{3}$	$50\frac{1}{3}$	$45\frac{1}{3}$	$43\frac{1}{3}$	$38\frac{1}{3}$	$32\frac{5}{6}$	$31\frac{5}{6}$	$27\frac{2}{3}$	$25\frac{2}{3}$	$23\frac{1}{3}$	18	$12\frac{2}{3}$	$10\frac{1}{3}$	$8\frac{1}{3}$	$6\frac{1}{3}$	$3\frac{1}{3}$	$2\frac{1}{3}$	Lawton Salt Works.								
21	70	$63\frac{2}{3}$	58	54	49	$47\frac{1}{2}$	42	$36\frac{1}{2}$	$35\frac{1}{2}$	$31\frac{1}{2}$	$29\frac{1}{2}$	27	$21\frac{1}{2}$	$16\frac{1}{2}$	14	12	10	7	6	$3\frac{2}{3}$	Wheelock.							
22	73	$66\frac{2}{3}$	61	57	52	$50\frac{1}{2}$	45	$39\frac{1}{2}$	$38\frac{1}{2}$	$34\frac{1}{2}$	$32\frac{1}{2}$	30	$24\frac{1}{2}$	$19\frac{1}{2}$	17	15	13	10	9	$6\frac{2}{3}$	3	Crownest.						
23	76	$69\frac{2}{3}$	64	60	55	$53\frac{1}{2}$	48	$42\frac{1}{2}$	$41\frac{1}{2}$	$37\frac{1}{2}$	$35\frac{1}{2}$	33	$27\frac{1}{2}$	$22\frac{1}{2}$	20	18	16	13	12	$9\frac{2}{3}$	6	3	Middlewich.					
24	$83\frac{1}{6}$	$76\frac{1}{6}$	$71\frac{1}{6}$	$67\frac{1}{6}$	$62\frac{1}{6}$	$60\frac{1}{3}$	$55\frac{1}{6}$	$49\frac{1}{6}$	$48\frac{1}{6}$	$44\frac{1}{6}$	$42\frac{1}{6}$	$40\frac{1}{6}$	$34\frac{1}{2}$	$29\frac{1}{2}$	$27\frac{1}{6}$	$25\frac{1}{6}$	$23\frac{1}{6}$	$20\frac{1}{6}$	$19\frac{1}{6}$	$16\frac{1}{6}$	$13\frac{1}{6}$	$10\frac{1}{6}$	$7\frac{1}{6}$	Wincham, near Northwich.				
25	87	$80\frac{2}{3}$	75	71	66	$64\frac{1}{2}$	59	$53\frac{1}{2}$	$52\frac{1}{2}$	$48\frac{1}{2}$	$46\frac{1}{2}$	44	$38\frac{1}{2}$	$33\frac{1}{2}$	31	29	27	24	23	$20\frac{2}{3}$	17	14	11	$3\frac{5}{6}$	Bestway. [Tunnel.			
26	$92\frac{1}{3}$	86	$80\frac{1}{3}$	$76\frac{1}{3}$	$71\frac{1}{3}$	$69\frac{1}{3}$	$64\frac{1}{3}$	$58\frac{1}{3}$	$57\frac{1}{3}$	$53\frac{1}{3}$	$51\frac{1}{3}$	$49\frac{1}{3}$	$43\frac{2}{3}$	$38\frac{2}{3}$	$36\frac{1}{3}$	$34\frac{1}{3}$	$32\frac{1}{3}$	$29\frac{1}{3}$	$28\frac{1}{3}$	26	$22\frac{1}{3}$	$19\frac{1}{3}$	$16\frac{1}{3}$	$9\frac{1}{6}$	$5\frac{1}{6}$	S. end of Preston		
27	93	$86\frac{2}{3}$	81	77	72	$70\frac{1}{2}$	65	$59\frac{1}{2}$	$58\frac{1}{2}$	$54\frac{1}{2}$	$52\frac{1}{2}$	50	$44\frac{1}{2}$	$39\frac{1}{2}$	37	35	33	30	29	$26\frac{2}{3}$	23	20	17	$9\frac{5}{6}$	6	$\frac{2}{3}$	*	
28	99	$92\frac{2}{3}$	87	83	78	$76\frac{1}{2}$	71	$65\frac{1}{2}$	$64\frac{1}{2}$	$60\frac{1}{2}$	$58\frac{1}{2}$	56	$50\frac{1}{2}$	$45\frac{1}{2}$	43	41	39	36	35	$32\frac{2}{3}$	29	26	23	$15\frac{5}{6}$	12	$6\frac{2}{3}$	6	†

\* North end of Preston Tunnel. The Junction with his Grace the Duke of Bridgwater's Canal.

† Runcorn, the Junction with the River Mersey.

STAF.



# STAFFORDSHIRE AND WORCESTERSHIRE CANAL.

Nº	Haywood, the Junction with the Canal from the Trent to the										
29	5	Radford Bridge, near Stafford.								[Mersey.	
30	10	5	Penkridge.								
31	$12\frac{2}{3}$	$7\frac{2}{3}$	$2\frac{2}{3}$	Gailey Bridge.							
32	18	13	8	$5\frac{1}{3}$	Crofs Green.						
33	$21\frac{1}{2}$	$16\frac{1}{2}$	$11\frac{1}{2}$	$8\frac{5}{6}$	$3\frac{1}{2}$	Junction with the Birmingham Canal.					
34	$23\frac{1}{2}$	$18\frac{1}{2}$	$13\frac{1}{2}$	$10\frac{5}{6}$	$5\frac{1}{2}$	2	Compton Wharf.				
35	$28\frac{1}{2}$	$23\frac{1}{2}$	$18\frac{1}{2}$	$15\frac{5}{6}$	$10\frac{1}{2}$	7	5	Gigetty Wharf.			
36	$31\frac{1}{2}$	$26\frac{1}{2}$	$21\frac{1}{2}$	$18\frac{5}{6}$	$13\frac{1}{2}$	10	8	3	Green Forge.		
37	$34\frac{1}{2}$	29	$24\frac{1}{2}$	$21\frac{5}{6}$	$16\frac{1}{2}$	13	11	6	3	Stewpony Wharf.	
38	$42\frac{1}{6}$	$37\frac{1}{6}$	$32\frac{1}{6}$	$29\frac{1}{2}$	$24\frac{1}{6}$	$20\frac{2}{3}$	$18\frac{2}{3}$	$13\frac{2}{3}$	$10\frac{2}{3}$	$7\frac{2}{3}$ Kidderminster.	
39	$46\frac{1}{2}$	$41\frac{1}{2}$	$36\frac{1}{2}$	$33\frac{5}{6}$	$28\frac{1}{2}$	25	23	18	15	12	$4\frac{1}{3}$ Stourport,
[the Junction with the River Severn.											

## BIRMINGHAM CANAL.

Nº	Autherly, the Junction with the Staffordshire and Worces-									
40	2	Price's Wharf, Wolverhampton.								[tershire Canal.
41	$8\frac{1}{3}$	$6\frac{1}{3}$	Gospel Oak.							
42	$11\frac{1}{3}$	$9\frac{1}{3}$	3	Tipton Green.						
43	$12\frac{1}{3}$	$10\frac{1}{3}$	4	1	Dudley Road,					
44	14	12	$5\frac{2}{3}$	$2\frac{2}{3}$	$1\frac{2}{3}$	Brad's Wharf.				
45	16	14	$7\frac{2}{3}$	$4\frac{2}{3}$	$3\frac{2}{3}$	2	Spon Lane.			
46	$22\frac{1}{2}$	$20\frac{1}{2}$	$14\frac{1}{6}$	$11\frac{1}{6}$	$10\frac{1}{6}$	$8\frac{1}{2}$	$6\frac{1}{2}$	Birmingham		
									[Wharf.	

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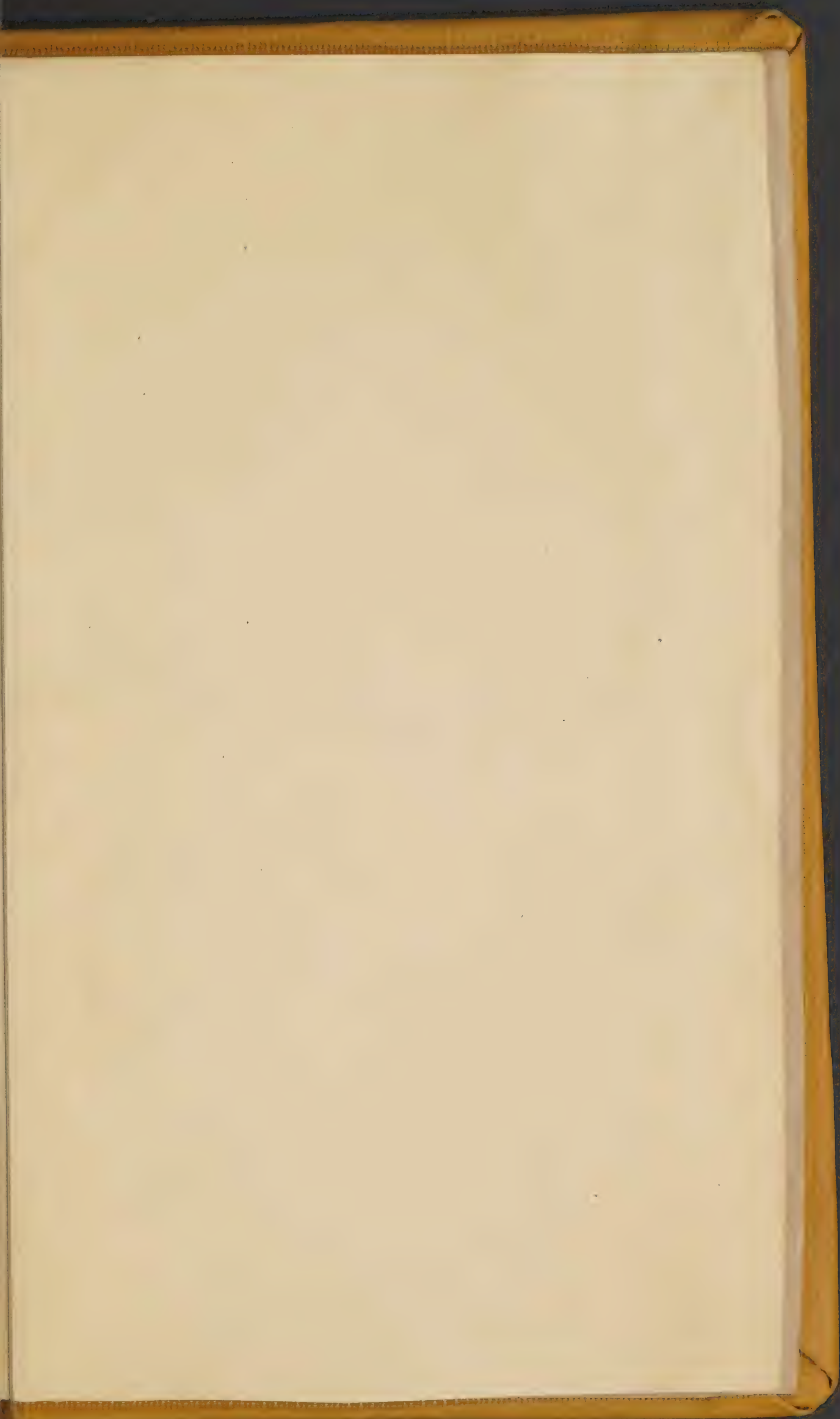
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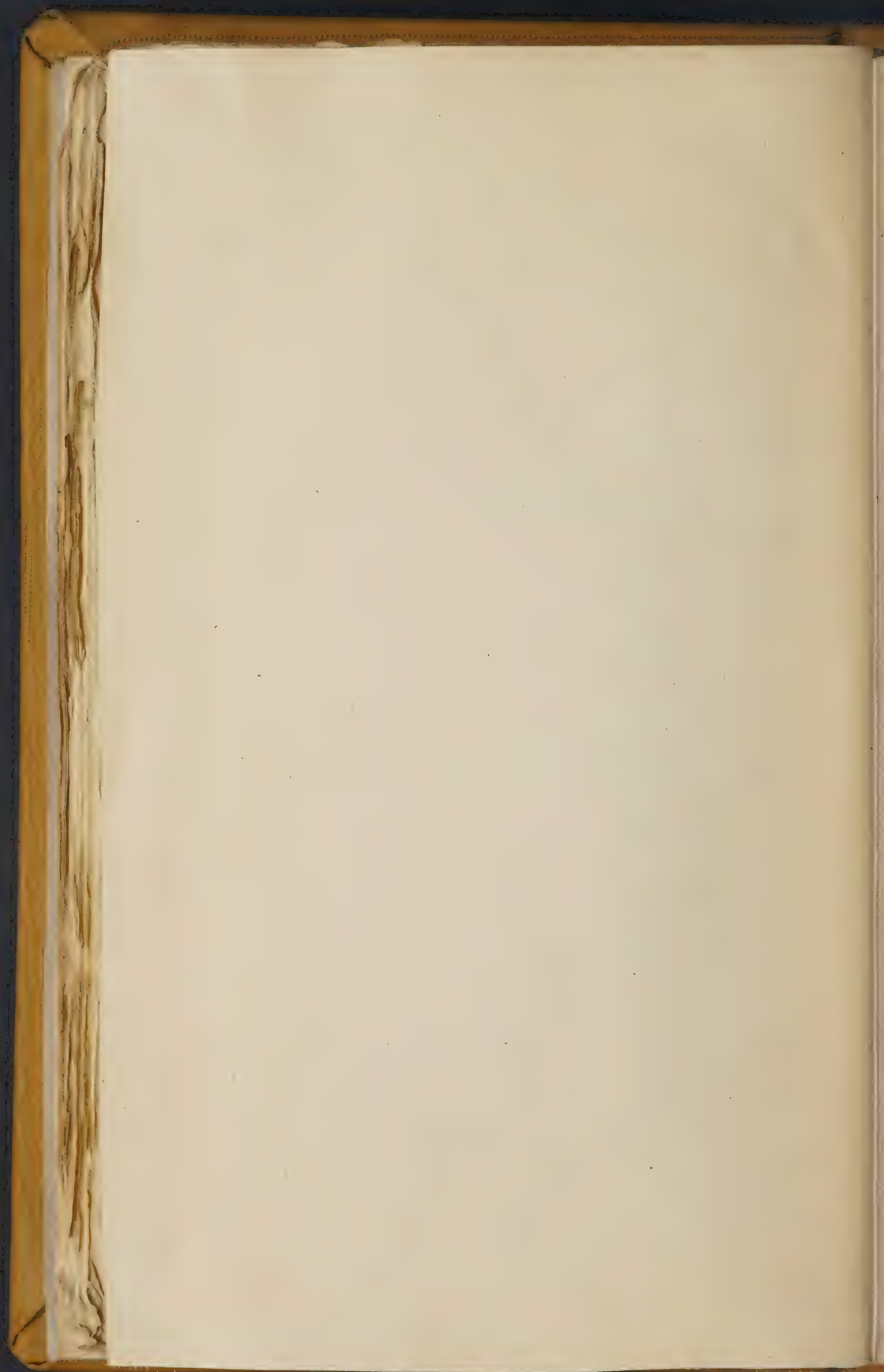
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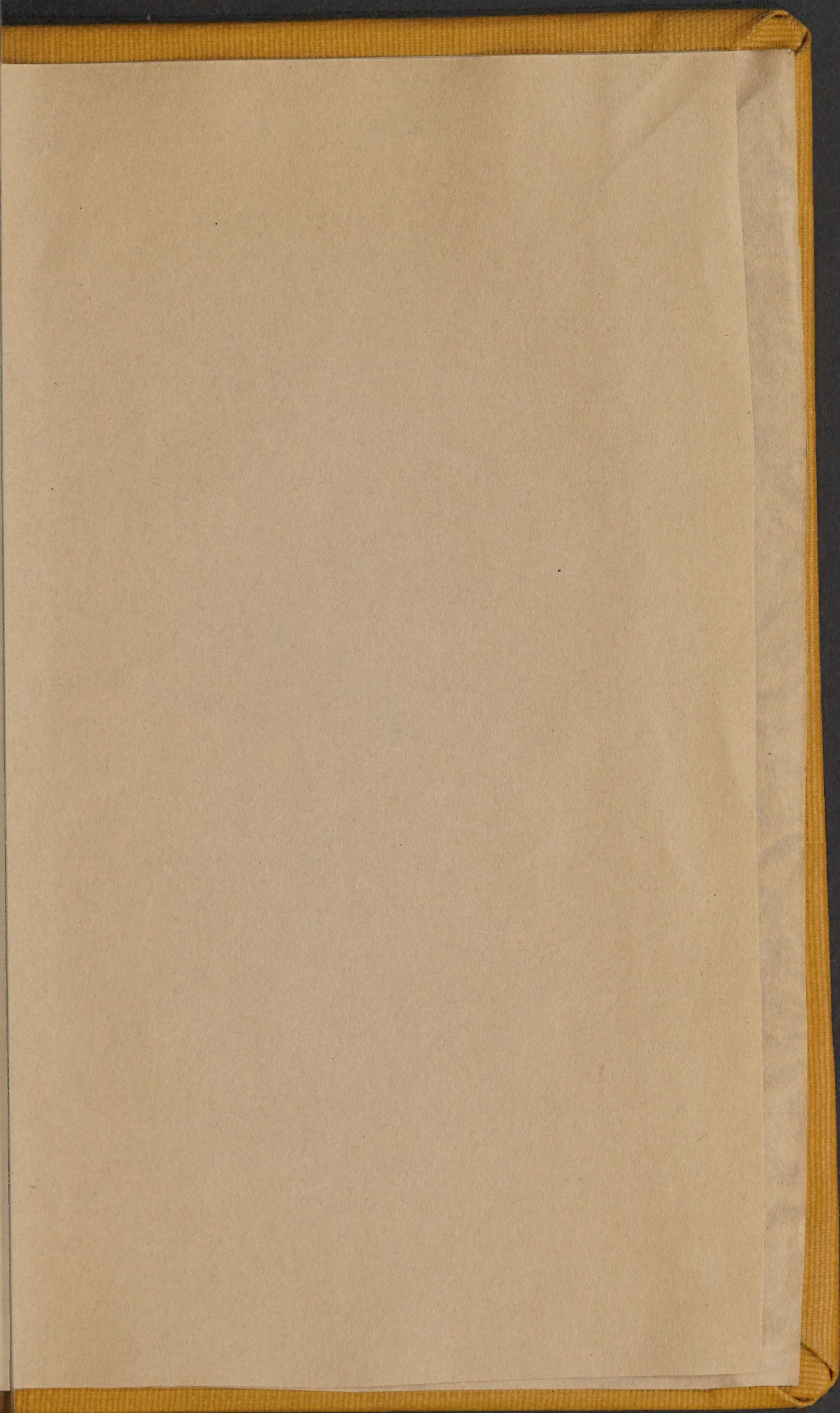
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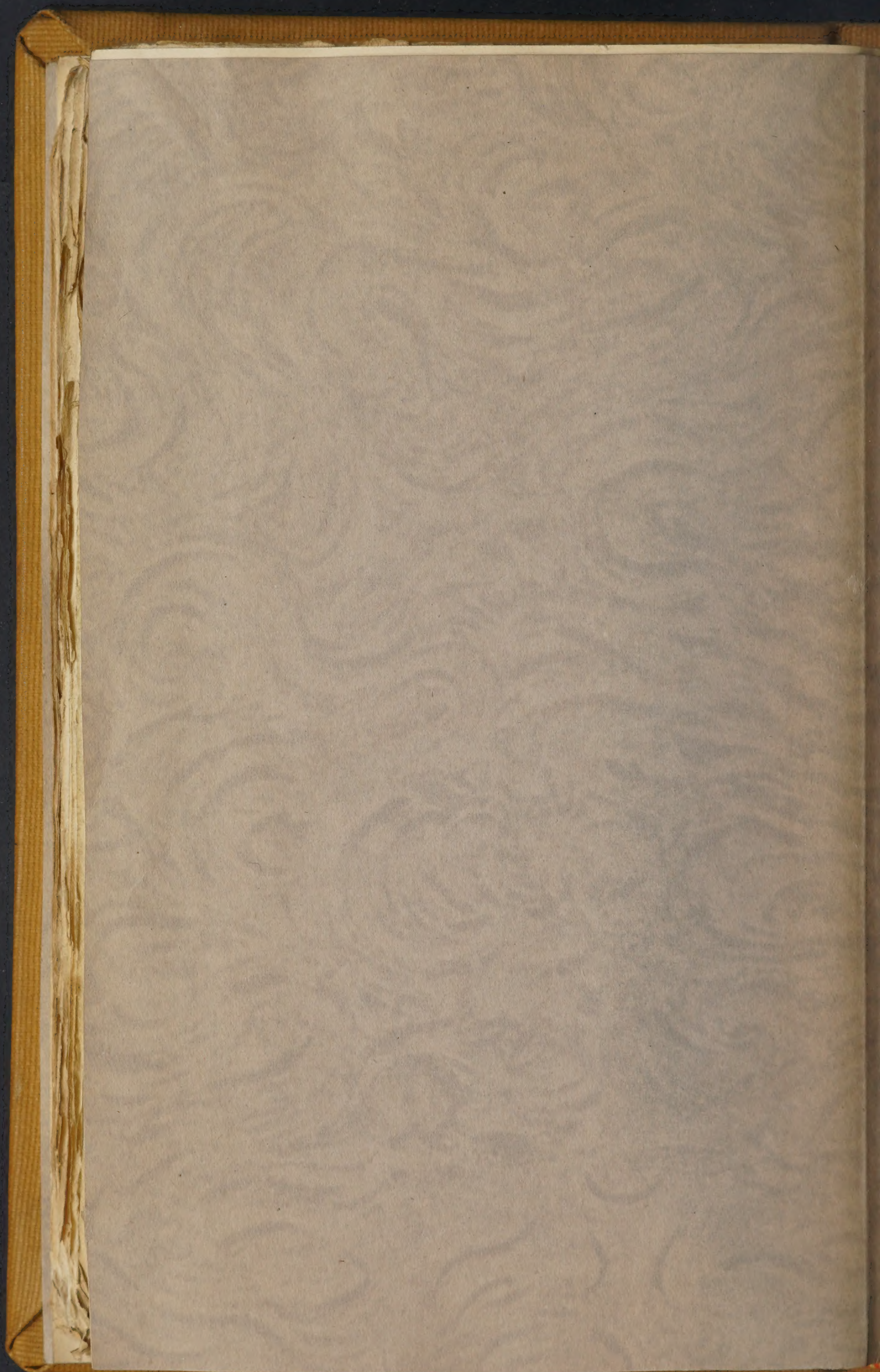














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